Understanding by Design®

Dysart Unified School District

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presented by

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Principles of Curriculum for Understanding*

Noted educational researcher, Dr. Robert Marzano, concluded that "a guaranteed and viable curriculum" is the most significant school level factor impacting student achievement.

Students presented with vast amounts of content knowledge that is not organized into meaningful patterns are likely to forget what they have learned and to be unable to apply the knowledge to new problems or unfamiliar contexts (Haidar, 1997). Curriculum for understanding provides ample opportunity for students to apply their knowledge in a variety of contexts and conditions. This helps them transfer their learning to new situations and better prepares them for future learning (Bransford and Schwartz, 2000). Providing students with frequent opportunities to apply what they learn in multiple contexts requires a reallocation of instructional time. Allowing time for in-depth learning means decisions must be made about what knowledge is of most worth. For this reason, the curriculum needs to specify clearly the appropriate balance between breadth and depth of coverage in terms of student learning outcomes.

A mathematics or science curriculum for advanced study that promotes learning with understanding:

1. Structures the concepts, factual content, and procedures that constitute the knowledge base of the discipline around the organizing principles (big ideas) of the domain.
2. Links new knowledge to what is already known by presenting concepts in a conceptually and logically sequenced order that builds upon previous learning within and across grade levels.
3. Focuses on depth of understanding rather than breadth of content coverage by providing students with multiple opportunities to practice and demonstrate what they learn in a variety of contexts.
4. Includes structured learning activities that, in a real or simulated fashion, allow students to experience problem solving and inquiry in situations that are drawn from their personal experiences and real-world applications.
5. Develops students' abilities to make meaningful applications and generalization to new problems and contexts.
6. Incorporates language, procedures, and models of inquiry and truth verification that are consistent with the accepted practice of experts in the domain.
7. Emphasizes interdisciplinary connections and integration and helps students connect learning in school with the issues, problems, and experiences that figure prominently in their lives outside of the classroom.

*Source: Committee on Programs for Advanced Study of Mathematics and Science in American High Schools

Key Understandings about...

-- Understanding --

• A primary goal of education is the development and deepening of student understanding of important ideas and processes within, and across, disciplines so that they can transfer their earning to new situations. Rote learning will not prepare students for transfer.

• Content and Standards need to be "unpacked" to identify the big ideas worth understanding and the essential questions worth exploring.

• Evidence of student understanding is revealed when students can apply (transfer) their learning to new situations within authentic contexts.

• Six facets of understanding – the capacity to explain, interpret, apply, shift perspective, empathize, and self-assess – serve as indicators that students understand.

Understanding must be "earned" by the learner. Teaching for understanding facilitates meaning making by students.

-- Design --

• Effective curriculum development reflects a three-stage design process called "backward design." This process helps to insure that curriculum plans are well aligned and focused on desired results. Backward design of curriculum helps avoid the twin problems of "textbook coverage" and "activity-oriented" teaching.

• The backward design process can be productively applied to planning a single unit, a year-long course, and an entire K-12 curriculum.

• Regular reviews of curriculum and assessment designs, based on design standards, are needed for quality control to avoid the most common design mistakes and disappointing results.

• Educators can "work smarter" in curriculum design by working collaboratively and sharing ideas via electronic networks (e.g., using the Eduplanet21 UbD Planner).

UbD in a Nutshell

Guiding Principles of Understanding by Design

1. UbD is a way of thinking purposefully about curricular planning and school reform. It offers a 3-stage design process, a set of helpful design tools, and design standards – not a rigid program or prescriptive recipe.

2. The primary goal of UbD is student understanding: the ability to make meaning of "big ideas" and transfer learning.

3. UbD "unpacks" and transforms Content Standards into the relevant Stage 1 elements and appropriate assessments in Stage 2.

4. Understanding is revealed when students autonomously transfer their learning through authentic performance. Six facets of understanding – the capacity to *explain, interpret, apply, shift perspective, empathize*, and *self assess* – serve as indicators of understanding.

5. Teachers are coaches of understanding, not mere purveyors of content or activity. They design for and support "meaning making" and "transfer" by the learner; and adjust to achieve intended results.

6. Planning is best done "backward" from the desired results and the transfer tasks that embody the goals. The 3 Stages (Desired Results, Evidence, Learning Plan) must align for the unit to be most effective.

7. Regular reviews of curriculum against design standards enhance curricular quality and effectiveness.

8. UbD reflects a "continuous improvement" approach. The impact of curriculum design -- student performance -- informs needed adjustments.

Key Questions of Backward Design

Stage 1: Desired Results

- *What long-term transfer goals are sought?*
- *What meanings should students make in order to arrive at important understandings?*
- *What essential questions will students explore?*
- *What knowledge & skill will students acquire?*
- *What established goals/Standards are targeted?*

Stage 2: Evidence

- *What performances and products will reveal evidence of meaning-making and transfer?*
- *By what criteria will performance be assessed, in light of Stage 1 desired results?*
- *What additional evidence will be collected for all Stage 1 Desired Results?*

Stage 3: Learning Plan

- *What activities, experiences, and lessons will lead to achievement of the desired results and success at the assessments?*
- *How will the learning plan help students Acquire basic knowledge and skills, Make Meaning of "big ideas," and Transfer their learning?*
- *How will the unit be sequenced and differentiated to optimize achievement for all learners?*

A Summary of Key Research Findings Supporting Understanding by Design

• Views of how effective learning proceeds have shifted from the benefits of diligent drill and practice to focus on students' understanding and application of knowledge.

• Experts' knowledge is organized... Their knowledge is not simply a list of facts and formulas that are relevant to the domain; instead, their knowledge is organized around core concepts or 'big ideas' that guide their thinking about the domain (e.g., Newton's second law of motion); it is "conditionalized" to specify the contexts in which it is applicable; it supports understanding and transfer (to other contexts) rather than only the ability to remember. Novices' knowledge is much less likely to be organized around big ideas; they are more likely to approach problems by searching for correct formulas and pat answers that fit their everyday intuitions.

• Learning must be guided by generalized principles in order to be widely applicable. Knowledge learned at the level of rote memory rarely transfers; transfer most likely occurs when the learner knows and understands underlying principles that can be applied to problems in new contexts. Learning with understanding is more likely to promote transfer than simply memorizing information from a text or a lecture.

• Skills and knowledge must be extended beyond the narrow contexts in which they are initially learned. For example, knowing how to solve a math problem in school may not transfer to solving math problems in other contexts. It is essential for a learner to develop a sense of *when* what has been learned can be used -- the conditions of application. Failure to transfer is often due to learners' lack of this type of conditional knowledge.

• Curricula that are a "mile wide and an inch deep" run the risk of developing disconnected rather than connected knowledge. Research on expertise suggest that a superficial coverage of many topics in the domain may be a poor way to help students develop the competencies that will prepare them for future learning and work."

• Feedback is fundamental to learning, but feedback opportunities are often scarce in classrooms. Students may receive grades on tests and essays, but these are summative assessments that occur at the end of projects. What are needed are formative assessments, which provide students with opportunities to revise and improve the quality of their thinking and understanding.

• Assessments must reflect the learning goals that define various environments. If the goal is to enhance understanding and applicability of knowledge, it is not sufficient to provide assessments that focus primarily on memory for facts and formulas. Many assessments measure only propositional (factual) knowledge and never ask whether students know *when, where,* and *why* to use that knowledge. Given the goal of learning with understanding, assessments and feedback must focus on understanding, and not only on memory for procedures or facts.

What is Understanding?

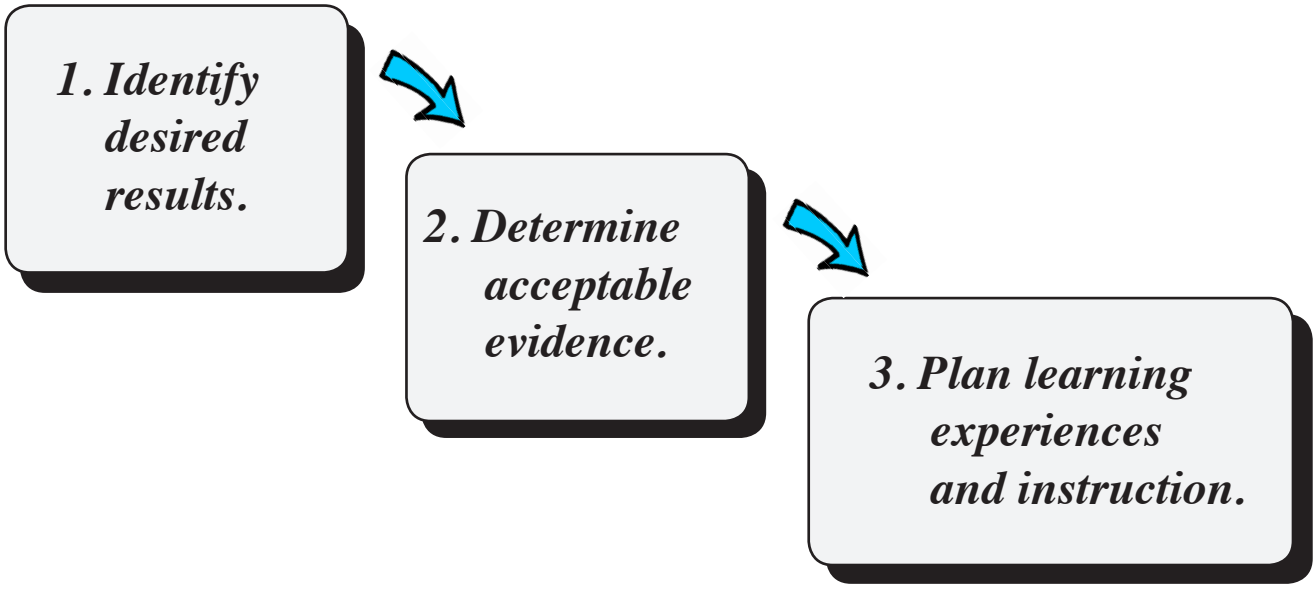
Part 1 – How would you define "understanding"? What does it mean to really understand or "get it"?

Someone who understands...

Part 2 - What are concrete indicators of *really* understanding something (as apposed to merely knowing important facts about it)? What can the person with understanding do that the person with only knowledge—even lots of knowledge—cannot do?

Indicators of Understanding	***Indicators of Knowledge without Understanding***

The Three Stages of Backward Design



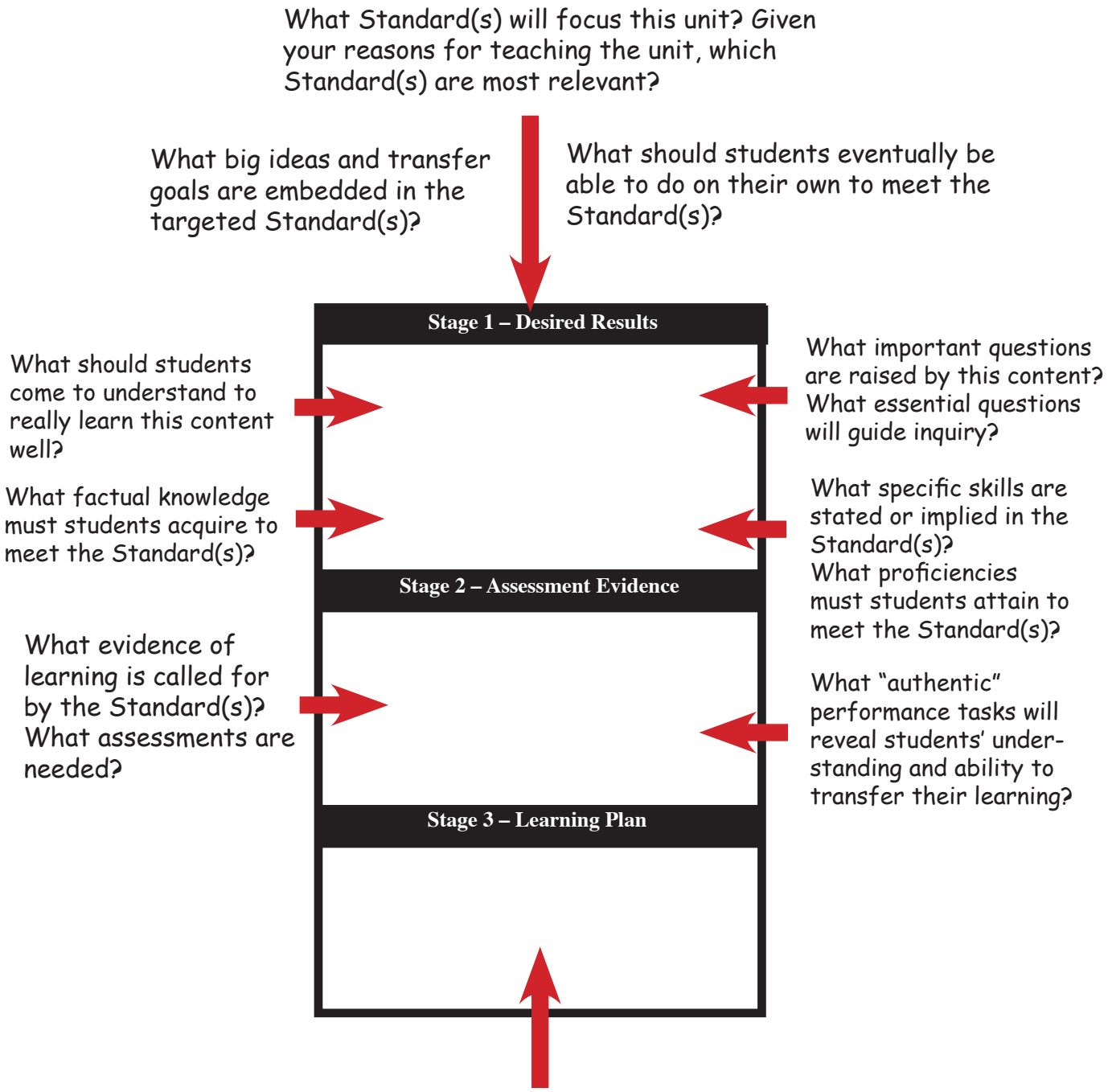
The backward design approach consists of three general stages:

Stage 1. Identify Desired Results – In stage one we consider the goals. What should students know, understand, and be able to do? What big ideas are worthy of understanding and implied in the established goals (e.g., Standards, curriculum objectives, etc.)? What "enduring" understandings are desired? What essential questions are worth pursuing to guide student inquiry and meaning making? What specific knowledge and skills are targeted and needed for effective performance?

Stage 2. Determine Acceptable Evidence – In the second stage we consider evidence of learning. How will we know if students have achieved the desired results and met the Standards? How will we know that students *really* understand the identified big ideas? What will we accept as evidence of proficiency? The backward design orientation suggests that we think about our design in terms of the collected assessment evidence needed to document and validate that the desired results of Stage 1 have been achieved.

Stage 3. Plan Learning Experiences and Instruction – With identified results and appropriate evidence of understanding in mind, it is *now* time to develop the learning plan. What will need to be taught and coached in light of the performance goals? What resources will be emplyed? How should the learning experiences be sequenced? What on-going assessments are neede dfor feedback? In planning learning activities, consider the AMT elements: How will we help learners *acquire* needed knowledge and skills? How will we engage learners in *making meaning* of important ideas? How will we equip students to *transfer* their learning?

UbD and Standards-based Curriculum Planning



Stage 1 – Desired Results

Established Goals

National Driver Development Standards

G1 Demonstrate a working knowledge of rules, regulations and procedures of operating an automobile

G2 Use visual search skills to obtain correct information and make reduced-risk decisions for effective speed and position adjustments

G3 Interact with other users within the Highway Transportation System by adjusting speed, space, and communications to avoid conflicts and reduce risk

G4 Demonstrate balanced vehicle movement through steering, braking, and accelerating in a precise and timely manner throughout a variety of adverse conditions

Source: *American Driver & Traffic Safety Association*

Transfer

Students will be able to independently use their learning to...

T1 drive responsibly, defensively and courteously.

T2 adapt driving to various traffic, road and weather conditions.

Meaning

UNDERSTANDINGS

Students will understand that...

U1 A motor vehicle can become a lethal weapon, and driving one demands constant attention.

U2 Defensive driving assumes that other drivers are not attentive and that they might make sudden or ill-advised moves.

U3 Effective drivers constantly adapt to various traffic, road, & weather conditions.

U4 Proper car maintenance is a safety measure that can help save money in the long run.

ESSENTIAL QUESTIONS

Students will keep considering...

Q1 What is a responsible driver?

Q2 What makes a defensive driver?

Q3 How and when should I adapt my diving?

Acquisition

Students will know...

K1 the driving rules and regulations

K2 meaning of traffic signs and signals

K3 basic car features and functions

K4 what to do in case of an accident

Students will be skilled at...

S1 adjusting seats and mirrors

S2 coordinating accelerator and brake

S3 signalling/communicating intentions

S4 merging into traffic

S5 parallel parking

Stage 2 – Evidence

Coding	Evaluative Criteria	Assessment Evidence
		PERFORMANCE TASK(S)
1.Transfer goals	• skillful • defensive • anticipates	1. *Task*: drive from home to school and back, with parental and teacher supervision. The goal is to demonstrate skillful, responsive, and defensive driving under real-world conditions.
2.Transfer goals	• responsive • courteous	2. *Task*: Same task as #1 but with rainy conditions.
3.Transfer goals		3. *Task*: Same task as #1 but with rush hour traffic.
4. Meaning Goals	• accurate • clear •complete	4. Prepare a tutoring booklet to help other young drivers come to understand the big ideas of safe and courteous driving.
		SUPPLEMENTARY EVIDENCE
5. Meaning Goals	• accurate • perceptive	5. Self-assess your driving and parking in Tasks 1 - 3 in terms of *courteous* & *defensive*. Discuss adjustments made.
6. Skill & Transfer Goals	• skilled	6. Observation of student driver in a driving simultor or car off road.
7. Knowledge Goals	• knows the law	7. Written test required for getting a license.
8. Skill Goals	• drives well enough to pass driving test	8. Road test required for getting a license.

Stage 3 – Learning Plan

Coding — **Code Key:** T = transfer, M = Meaning-making, A = Acquisition

Pre-assessment

Pre-assessment of driving knowledge, skill, understandings, and attitudes using surveys and simulators.

Formative Assessments

KEY LEARNING EVENTS

Note: this is an overview of a drivers' ed. plan. A typical unit summarizes all learning events in more detail.

Expert driving is modeled via video and the driving instructor. The requirement of the driver's test are reviewed.

All instruction is carried out and formatively assessed under a 4-step system for developing autonomy:

- the driving skill is explicitly taught and modeled
- the skill is practiced and performed with guidance in a simple/controlled situation
- the skill practiced and performed independently in a simple/controlled situation
- the skill is performed independently in more complex, authentic situations

Students practice the following driving skills in a simulator and in controlled driving situations with an instructor:

Car Check	Circles	Anticipation & Planning Ahead
Safety Checks	Pedestrian Crossings	Use of Speed
Controls & Instruments	Highways	Other Traffic
Starting up, Moving and Stopping	Turns	Intersections
Safe Positioning	Reversing	Darkness
Mirrors	Parking	Weather Conditions
Signals	Emergency Stopping	Rules & Laws
	Security	

Guided instruction is provided in terms of how to handle a variety of driving conditions, including: dry roads, wet roads, daylight, darkness, highway, city, country, during rush hour and off-peak hours.

The essential questions are used to focus attention during practice and guide reflection and self-assessment following each simulated or actual driving experience.

On-going assessment and feedback by the instructor as students practice new driving skills in the simulator and on the road. Look for such common misconceptions and skill deficits as -

- failure to check mir rors and peripheral vision
- not adjusting in response to changes in road, traffiic or weaher conditions
- not perceiving speed of oncoming cars dur ing merges and turns

Stage 1 – Desired Results

Established Goals

What Standards, Outcomes, Program and/or Mission related goal(s) will this unit address?

Transfer

Students will be able to independently use their learning to…

What long-term, independent accomplishments are desired?

Meaning

UNDERSTANDINGS
Students will understand that…

What specifically do you want students to come to understand?

ESSENTIAL QUESTIONS
Students will keep considering…

What thought-provoking questions will foster inquiry, meaning making, and transfer?

Acquisition

Students will know…

What facts and basic concepts should students know?

Students will be skilled at…

What discrete skills and processes should students be able to use?

Stage 2 – Evidence

Coding	Evaluative Criteria	Assessment Evidence
Are all of the Desired Results being appropriately assessed?	**What criteria will be used in each assessment to evaluate attainment of the Desired Results?**	**PERFORMANCE TASK(S)** **How will students demonstrate their understanding (meaning-making and transfer) through authentic performance?** *Consider the six facets when developing assessments of understanding. Use the G.R.A.S.P.S. elements to frame an authentic context for the task(s).* **SUPPLEMENTARY EVIDENCE** **What other evidence will you collect to determine whether Stage 1 goals were achieved?**

Stage 3 – Learning Plan

Coding	

Align to Stage 1 goals or A-M-T

What pre-assessments will you use to check students' prior knowledge, skill levels and potential misconceptions?

Pre-assessment

Formative Assessments

KEY LEARNING EVENTS

Are all three types of goals (acquisition, meaning making, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment across all three stages?

While detailed lesson plans are not expected here, you should include sufficient information so that another teacher who is familiar with the unit's content could understand and follow the basic learning plan. That means not just stating WHAT learners will do but WHY ; i.e., the purpose of the learning the activity.

Optional: Use the column on the left to code your learning activities; e.g., their alignment with Stage 1 elements, T-M-A, or W.H.E.R.E.T.O.

How will you monitor students' progress towards acquisition, meaning-making, and transfer during the unit?

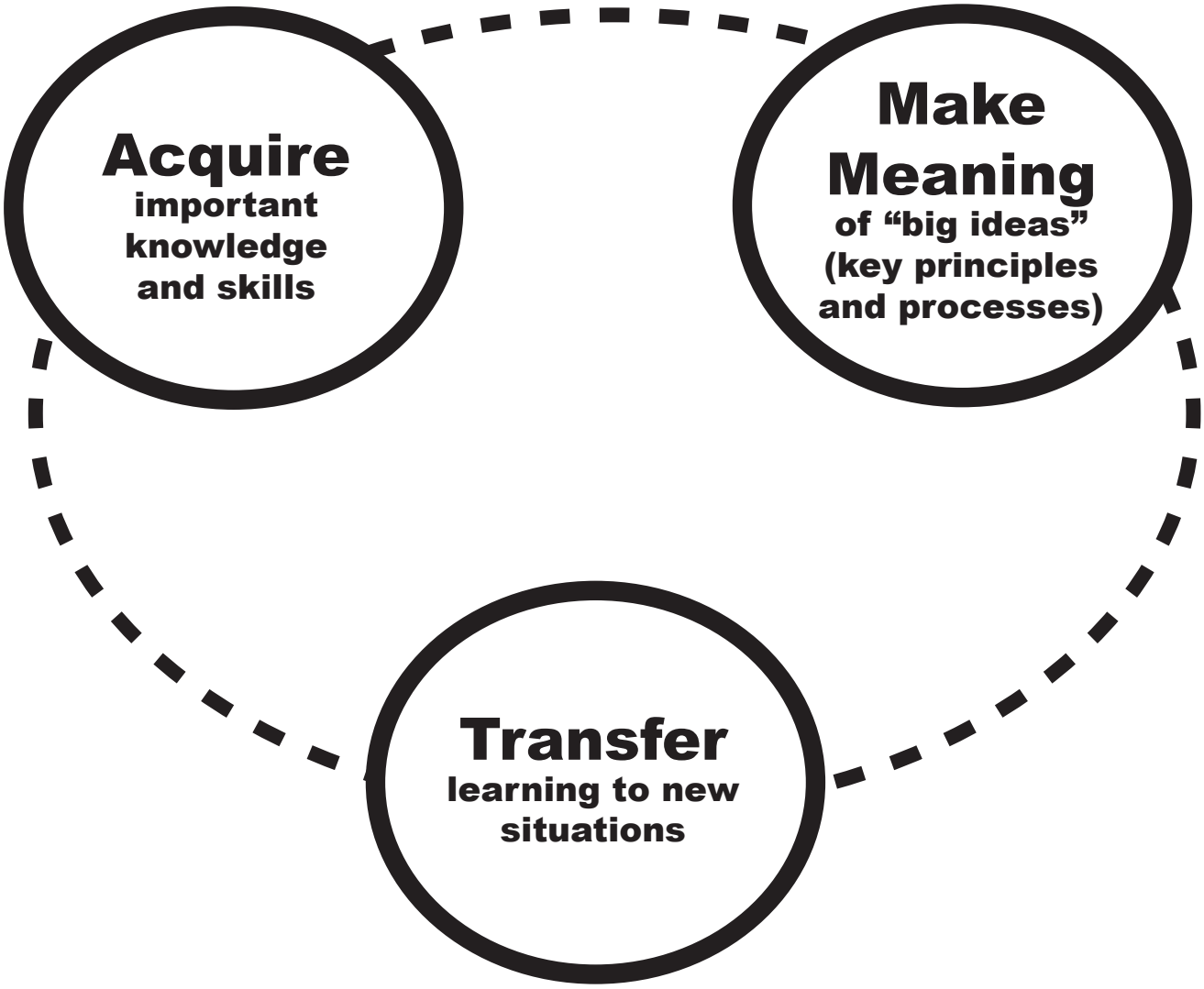
What are potential trouble spots and student misunderstandings?

How will students get the feedback they need and opportunities to make use of it?

Three Types of Learning Goals

We have found it useful to consider three types of learning goals: 1) acquisition of new information and skill, 2) making meaning of that content (i.e., coming to understand), and 3) transfer of one's knowledge (i.e., applying one's learning to new situations). These goals are interrelated, yet distinct. The distinctions are important since each type of goal requires different approaches to both instruction and assessment.

These three categories link directly to elements identified in *Understanding by Design*. In Stage 1 teachers specify the knowledge and skill that they intend students to **acquire**. They also decide upon the "big ideas" they want students to come to understand and develop essential questions to help students **make meaning** of those ideas. Ideally, units are framed with long-term **transfer** goals in mind.



UbD Unit Design Standards 2.0

Key: 3 = meets the standard 2 = partially meets the standard 1 = does not yet meet the standard

Stage 1	**3**	**2**	**1**	**Feedback & Guidance**
1. The listed Transfer Goals specify desired long-term, genuine accomplishment.				
2. The identified Understandings reflect important, transferable ideas.				
3. The identified Understandings are stated as full-sentence generalizations – *Students will understand that…*				
4. Essential Questions are open-ended and thought provoking.				
5. Relevant Standards, Mission, and/or Program Goals are addressed explicitly in all 3 Stages.				
6. The identified knowledge and skills are needed to address the established goals, achieve the targeted understanding(s), and support transfer.				
7. All the elements are aligned so that Stage 1 is focused and coherent.				
Stage 2				
8. The specified assessments provide valid evidence of all desired results; i.e., Stage 2 aligns with Stage 1.				
9. The specified assessments include authentic transfer tasks based on one or more facets of understanding.				
10. The specified assessments provide sufficient opportunities for students to reveal their attainment of the Stage 1 goals.				
11. Evaluative criteria for each assessment are aligned to the Desired Results in Stage 1.				
Stage 3				
12. Appropriate learning events and instruction will help learners:				
a. Acquire targeted knowledge and skills.				
b. Make meaning of important ideas.				
c. Transfer their learning to new situations.				
13. The W.H.E.R.E.T.O. elements are included so that the unit is likely to be engaging and effective for all learners.				
Overall				
14. All 3 stages are coherent and in alignment.				
15. The unit design is feasible and appropriate in the time available.				

TRANSFER GOALS

Definition

Transfer Goals highlight the effective uses of understanding, knowledge, and skill that we seek in the long run; i.e., what we want students *to be able to do* with their learning when they confront new challenges – both in and outside of school. There are a small number of overarching, long-term transfer goals in each subject area. For example, a long-term aim in mathematics is for students to be able to tackle "messy, real world" problems on their own. A long-term transfer goal in history is for students to apply the lessons of history when considering contemporary issues.

In every case, the ability to transfer learning manifests itself in not just one setting but in varied situations. Transfer is about independent performance in context. You can only be said to have fully understood if you can apply your learning without someone telling you what to do and when to do it. In the world beyond the classroom, no teacher is there to direct and remind you about which lesson to plug in here or there. Transfer is about intelligently and effectively drawing from your repertoire to handle new situations on your own. Thus, the goal of transfer requires that the assessments (Stage 2) need to include performance tasks that require transfer, and that the learning plan (Stage 3) be designed to help the student to become increasingly autonomous.

Transfer goals have several distinguishing characteristics:

- They are long-term in nature; i.e., they develop and deepen over time.
- They are performance based; i.e., require application (not simply recall).
- The application occurs in new situations, not ones previously taught or encountered; i.e., the task cannot be accomplished as a result of rote learning.
- The learners must apply their learning autonomously on their own, without coaching or excessive hand-holding by a teacher.
- Transfer calls for the use of habits of mind; i.e., good judgment, self regulation, persistence along with academic understanding, knowledge and skill.

Rather than having each teacher identify their own tranfer goals for every unit, we recommend that district or school teams identify a *few* long-term transfer goals as exit outcomes for each discipline. Interdisciplinary transfer goals (e.g., critical thinking, collaboration) are typcially found in distrct and school Mission statements.

Long Term Transfer Goals

examples

Students will be able to independently use their learning to:

History
• Use knowledge of patterns of history to better understand the present and prepare for the future.
• Critically appraise historical claims and analyze contemporary issues.
• Participate as an active and civil citizen in a democratic society.

Health and Physical Education
• Make healthful choices and decisions regarding diet, exercise, stress management, alcohol/drug use throughout one's life.
• Play a chosen game skillfully and with good sportsmanship.

Mathematics
• Make sense of never-before-seen, "messy"problems and persevere in solving them.
• Construct viable arguments involving mathematics and statistics and critique the reasoning of others.

Performing & Fine Arts
• Find at least one arts discipline in which they develop sufficient competence to continue active involvement in creating, performing, and responding to art as an adult.
• Respond by analyzing and interpreting the artistic communications of others.

Reading
• Read and respond to text in various genres (literature, non-fiction, technical) for various purposes (entertainment, to be informed, to perform a task).
• Comprehend text by inferring and tracing the main idea, interpreting ("between the lines"), critically appraising, and making personal connections.

Research
• Locate pertinent information from varied sources (print, on-line; primary, secondary).
• Critically evaluate sources and information (e.g., for accuracy, completeness, timeliness, lack of bias, properly referenced).

Science
• Evaluate scientific claims and analyze current issues involving science or technology.
• Conduct a sound investigation to answer an empirical question.

World Language
• Effectively communicate with varied audiences and for varied purposes while displaying appropriate cultural understanding.

Writing
• Write in various genres for various audiences in order to explain (expository), entertain (narrative/poem), argue (persuasive), guide (technical), and challenge (satirical).
• Carefully draft, write, edit, and polish one's own and others' writing to make it publishable.

Transfer Goals

examples from schools and districts

Science Transfer Goals Source: North Slope Borough School District, Barrow, Alaska (July 2012)
Students will be able to independently use their learning to:

- Apply knowledge of science and engineering to engage in public discussions on relevant issues in a changing world.
- Conduct investigations, individually and collaboratively, to answer questions.
- Evaluate scientific claims for validity.
- Think systemically.

Visual Arts Transfer Goals Source: Sheridan School, Washington, DC (June 2011)
Students will be able to independently use their learning to:

- Create engaging and purposeful artistic expressions in forms that vary in terms of media and style.
- Communicate ideas, experiences, and stories through art.
- Respond to the artistic expression of others through global understanding, critical stance, personal connection, and interpretation.
- Respond to technical and conceptual challenges of his/her own.
- Develop an independent artistic vision.

World Languages Transfer Goals Source: The Dalton School, New York, NY (March 2012)
Students will be able to independently use their learning to:

- Communicate effectively in the target language(s) in realistic situations while displaying a sensitivity to culture and context.
- Emulate native speakers.
- Willingly taking risks with language, both within and outside of the classroom.

Examples of Transdisciplnary and 21st Century Skills

Critical Thinking

- Think critically about information and claims encountered at school and beyond by seeking clarity, accuracy, sound evidence, good reasons, and fairness.

Communication

- Effectively communicate for different purposes and varied audiences using appropriate media.

Collaboration

- Work effectively with, and learn from, others in a variety of situations, in school and beyond.

Research

- Locate pertinent information from varied sources (print, on-line; primary, secondary).
- Critically evaluate sources and information (e.g., for accuracy, completeness, timeliness, lack of bias, properly referenced).

Four Types of Big Ideas

concepts

- adaptation
- equivalence
- rhythm
- migration
- diversity
- perspective

themes

- good & evil
- heores & sheroes
- the Gilded Age
- freedom & responsibility
- the nature of truth
- the pursuit of happiness

Big Ideas

processes

- Critical Thinking
- Problem Solving
- Scientific Investigation
- Writing Process
- Historical Inquiry
- Creativity

principles

- Force equals mass times acceleration (F=MA).
- Price is a function of supply and demand.
- Water seeks its own level.
- In the absence of forces, an object at rest will remain at rest.

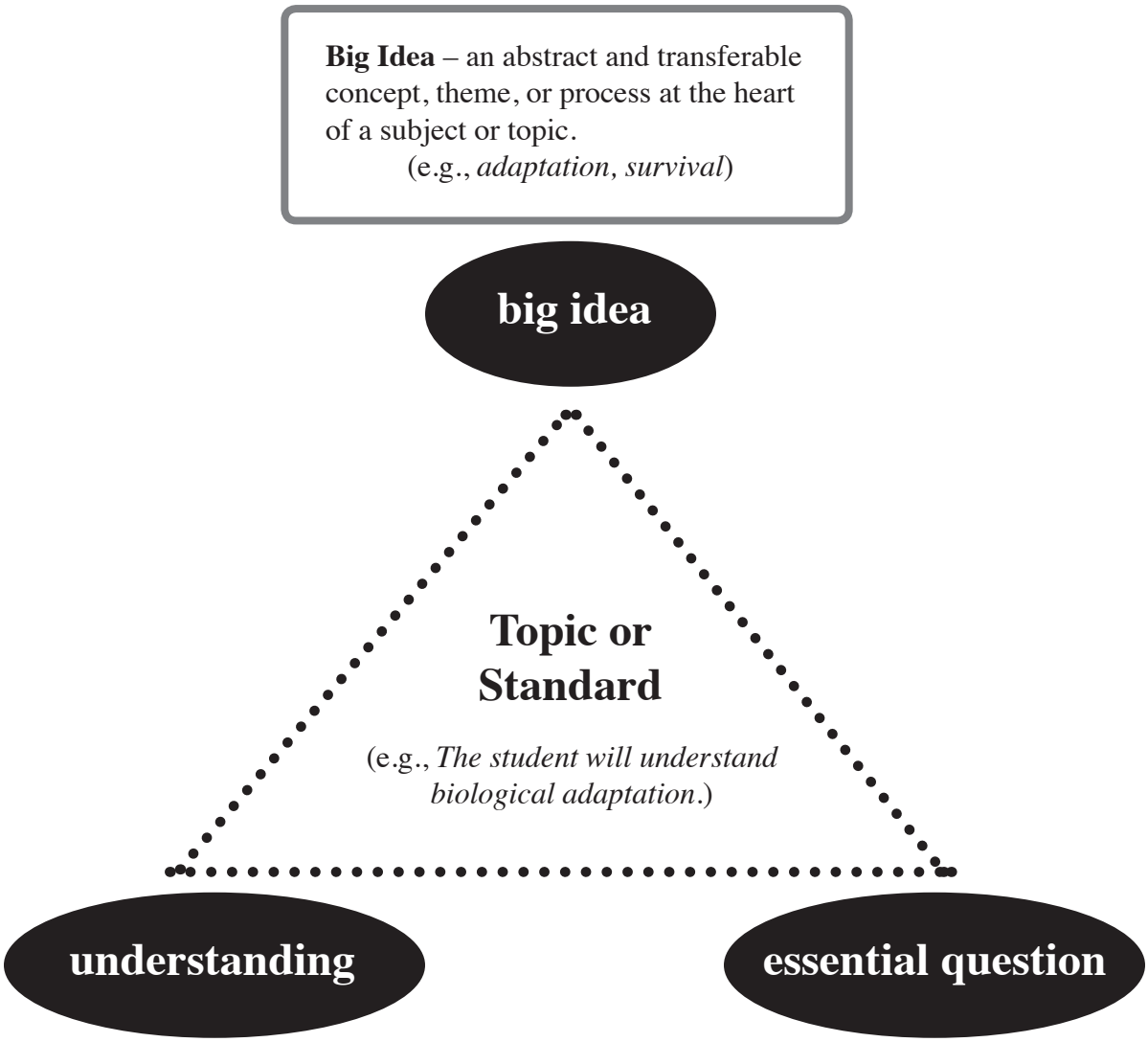
Concepts (transferrable "big ideas")

examples

- ❒ abundance/scarcity
- ❒ acceptance/rejection
- ❒ adaptation
- ❒ aging/maturity
- ❒ balance
- ❒ change/continuity
- ❒ challenge
- ❒ character
- ❒ community (ies)
- ❒ connections
- ❒ conflict
- ❒ cooperation
- ❒ correlation
- ❒ courage
- ❒ creativity
- ❒ culture
- ❒ cycles
- ❒ defense/protection
- ❒ democracy
- ❒ discovery
- ❒ diversity
- ❒ environments
- ❒ equilibrium
- ❒ evolution
- ❒ exploration
- ❒ fairness
- ❒ friendship
- ❒ harmony
- ❒ honor
- ❒ interdependence
- ❒ interactions
- ❒ invention
- ❒ justice
- ❒ liberty
- ❒ loyalty
- ❒ migration
- ❒ mood
- ❒ order
- ❒ patterns
- ❒ perspective
- ❒ production/consumption
- ❒ proof
- ❒ survival
- ❒ repetition
- ❒ rhythm
- ❒ symbol
- ❒ systems
- ❒ technology
- ❒ tyranny
- ❒ wealth
- ❒ other: _____

Big Ideas, Understandings and Essential Questions

The following visual represents the interrelationship among big ideas, understandings and essential questions. Understanding is needed for transfer.



U

Understanding – a full-sentence generalization, specifying what we want students to come to understand about the big idea(s).
e.g., *Students will understand that... Living organisms (populations) adapt in order to survive harsh or changing environments*.

Q

Essential Question – a provocative, open-ended question, designed to guide inquiry into the big idea(s). By actively exploring the essential question(s), students make meaning and deepen their understanding.
e.g., *How do living organisms survive in harsh or changing environments?*

UNDERSTANDINGS

Definition

Understandings refer to the important, transferrable ideas and processes that students should come to understand. Understandings differ in scope and breadth. **Overarching** understandings point beyond the specifics of a unit to the larger, transferrable ideas that spiral throughout the curriculum. **Topical** understandings target the particular insights we want students to attain within a unit of study. Topical understandings are less likely to transfer to other topics. Effective understandings…

- Reflect important, transferrable ideas
- Are stated as full-sentence generalizations in response to the stem:

Students will understand that…

Desired understandings are identified in Stage 1 for the purpose of:

1. focusing curriculum around enduring, transferable learning to avoid fixation on simply covering and testing discrete learning objectives;
2. encouraging active meaning making by students; and
3. preparing students to be able to transfer their learning to new situations.

Overarching Understandings	Topical Understandings
English/Language Arts Audience and purpose influence a writer's choice of organizational patterns, language, and literary techniques to elicit an intended response from readers.	Unit on Poetry Poets use rhyme schemes, meter (regular rhythms) and word sounds (e.g., alliteration) to engage their readers.
Science The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.	Unit on Cells Special structures within cells are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
Physical Education A muscle that contracts through its full range of motion will generate greater force.	Unit on Golf A full stroke with follow-through will increase your distance on a drive.

Understandings

examples

Students will understand that….

Arithmetic (numeration)
• Numbers are concepts that enable people to represent quantities, sequences, and rates.
• Different number systems can represent the same quantities (e.g., bases).

Art
• The greatest artists often break with established traditions and techniques to better express what they see and feel.
• Available tools, techniques and resources influence artistic expression.
• Great art addresses universal themes of human existence.

Dance
• Dance is a language of shape, space, timing and energy.
• Movement can communicate ideas and feelings.

Economics
• In a free-market economy, price is a function of supply and demand.
• Relative scarcity may lead to trade and economic interdependence or to conflict.

Foreign/World Language
• Studying other languages and cultures offers insights into our own.
• Meaning is conveyed through phrasing, intonation, and syntax. (Just because you can translate all the words doesn't mean you understand the speaker.)

Geography
• The topography, climate, and natural resources of a region influence the culture, economy, and life-style of its inhabitants.
• All maps distort the earth's representation of area, shape, distance, and/or direction.

Government
• Democratic governments must balance the rights of individuals with the common good.
• A written constitution sets forth the terms and limits of a government's power.
• Different political systems vary in their tolerance and encouragement of innovation.

History
• History involves interpretation; historians can and do disagree.
• Historical interpretation is influenced by one's perspective (e.g., freedom fighters vs. terrorists).

Media/Technology
• Technological progress presents new possibilities and problems.
• Just because it is on the Internet or in a book, doesn't make it true.

Understandings

examples

Literature

• Novelists often provide insights about human experience through fictional means.
• An effective story engages the reader by setting up questions – tensions, mystery, dilemmas, or uncertainty - about what will happen next.
• Everybody is entitled to an opinion about what a text means, but some interpretations are more insightful and supportable than others.

Mathematics

• Sometimes the "correct" mathematical answer is not the best solution to "real-world" problems.
• Heuristics are strategies that can aid problem solving (e.g., breaking a complex problem into chunks, creating a visual representation, working backward from the desired result, guess and check).
• Statistical analysis and data display often reveal patterns that may not be obvious.

Music

• The silence is as important as the notes.
• Popular music has shifted from emphasizing melody and lyrics to emphasizing multi-layered rhythms.

Physical Education/Athletics

• Creating "space" away from the ball/puck spreads the defense and increases scoring opportunities (e.g., in basketball, soccer, football, hockey, water polo, and lacrosse).
• The most efficient and effective swimming strokes involve pulling and pushing the water directly backward.
• Proper follow through increases accuracy when throwing (e.g., baseball, foul shot) and swinging (e.g., golf, tennis).

Reading/Language Arts

• Effective readers use specific strategies to help them better understand the text (e.g., using context clues, questioning the author, predicting what will come next, re-reading, summarizing, etc.
• Different types of texts (e.g., narrative, mystery, biography, expository, persuasive, etc.) have different structures. Understanding a text's structure helps a reader better understand its meaning.

Science

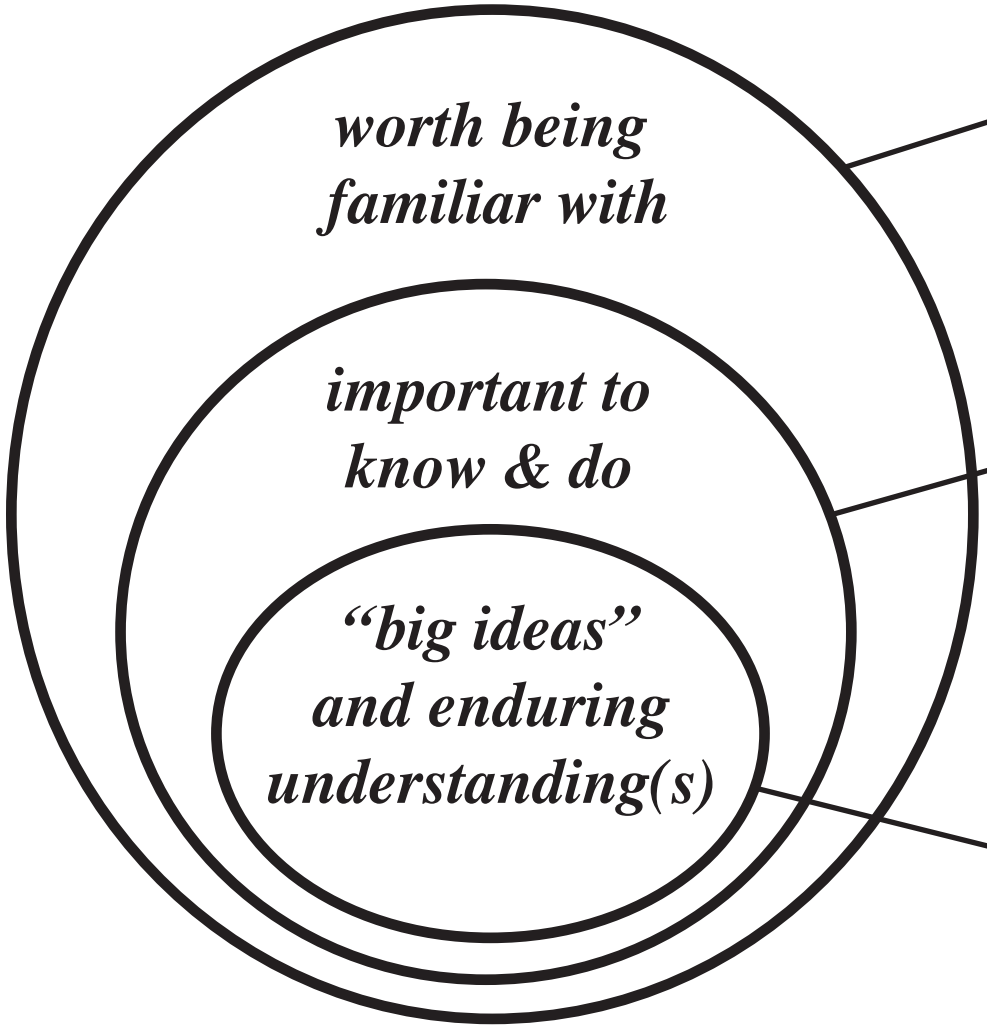
• Scientific claims must be verified by independent investigations.
• Standardized measures allow people to more accurately describe the physical world.
• Correlation does not insure causality.

Writing

• Audience and purpose (e.g., to inform, persuade, entertain) influence the use of literary techniques (e.g., style, tone, word choice).
• Punctuation marks and grammar rules are like highway signs and traffic signals – they guide readers through the text to help avoid confusion.

Clarifying Content Priorities

(example – nutrition – elementary/middle)



familiar with:

- general eating patterns and menus from the past
- different conditions requiring dietary restrictions; e.g., high blood pressure, diabetes, stomach ulcers

important to know and do:

- types of food in each of the food groups and their nutritional values
- the USDA Food Plate guidelines
- Interpret nutritional information on food labels

big ideas:

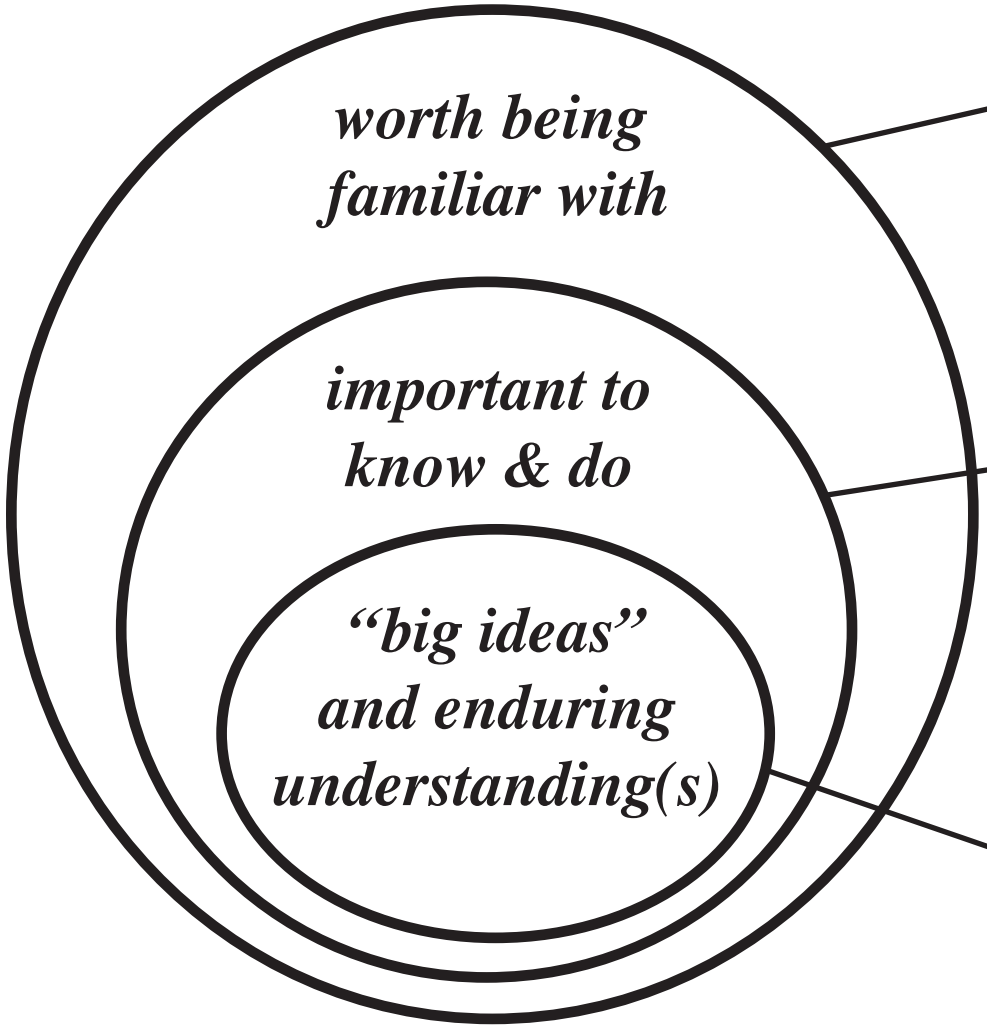
– balanced diet – nutritional needs

understandings:

- "You are what you eat." Your diet affects your health, appearance, and performance.
- People have different dietary needs based on age, activity level, weight, and various health considerations.

Clarifying Content Priorities

(example – statistics – secondary)



familiar with:

- key figures who contributed to the development of modern statistics; e.g. Blaise Pascal and Lewis Terman.
- the history of the "bell curve" (normal distribution)

important to know and do:

- measures of central tendency - mean, median, mode, range, standard deviation
- statistical terminology
- data displays - bar graph, line plot, stem and leaf plot
- various statistical formulas

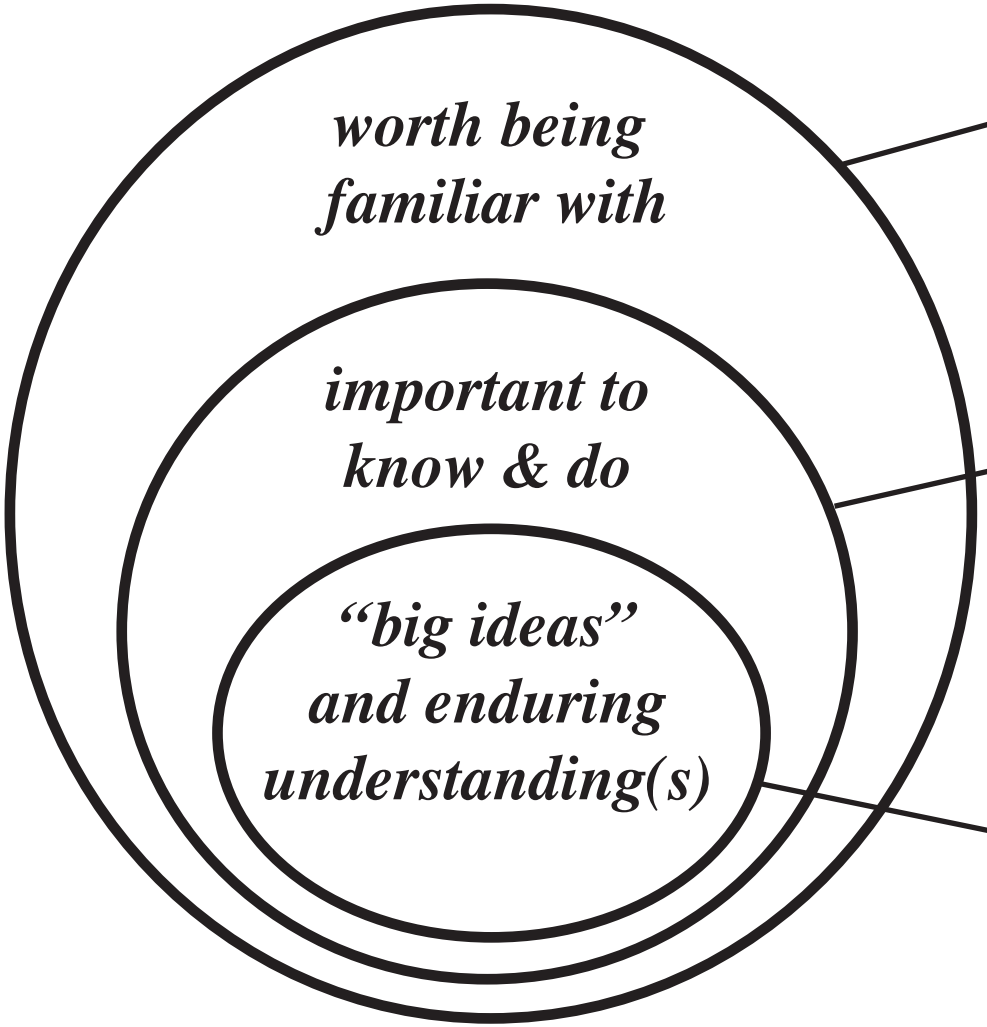
big ideas:

– sampling – patterns – prediction
– correlation – degrees of confidence

understandings:

- Statistical analysis and data display often reveal patterns. Patterns enable prediction.
- Sometimes sampling is better than counting.
- Correlation does not insure causality.
- Statistics can mislead as well as reveal.

Clarifying Content Priorities



familiar with:

important to know and do:

big ideas:

understandings:

Combining Concepts to Form Understandings

Dr. Lynn Erickson suggests the following practical process for developing a desired understanding:

Combine two or more concepts to form a full-sentence generalization.

Here are examples:

• Scientific **claims** must be verified by **independent investigations** that attempt to **replicate** reported findings.

• **Correlation** does not insure **causality**.

• The **topography**, **climate**, and **natural resources** of a **region** influence the **culture**, **economy**, and **life-style** of its inhabitants.

• Proper **follow through** increases **accuracy** when throwing (e.g., baseball, foul shot) and swinging (e.g., golf, tennis).

• **Audience** and **purpose** influence the use of **rhetorical** and **literary techniques** in speaking and writing.

• **Linear functions** display relationships that exhibit a **constant rate of change**.

• **True friendship** is revealed more during **hard times** than **happy** ones.

Now, try your hand at this process:

_____

_____

_____

Source: Erickson, L., Lanning, L., and French, R. (2017) *Concept-Based Curriculm and Instruction (2nd edition)*. Thousand Oaks, CA: Corwin Press.

Tips on Framing Understandings

Desired understandings should identify transferable concepts, principles and processes.

❏ Consider: If your unit topic is a "story," then what is (are) the moral(s) of your story? By stating the understanding as a "moral of the story," designers move beyond topics to clarify the complete understanding they seek. For example, in a unit on animal adaptation, one of the "morals" can be stated as, *Living organisms have developed adaptive mechanisms to enable them to survive harsh or changing environments*.

❏ To insure a conceptual focus, Dr. Harvey Silver advises titling a unit as *A Study In or Of...* For example, a unit on The Rainforest = A Study in A COMPLEX ECOSYSTEM; a unit on Decimals, Fractions, Percentages = A Study in EQUIVALENCE; a unit on the story, Frog and Toad and Friends = A Study in TRUE FRIENDSHIP.

❏ Avoid truisms – statements that are true by definition (e.g., *Triangles have 3 sides*) or state the obvious (e.g., *Musicians work with sounds to create music)*. Likewise, vague generalities (e.g., *America is a complex country*. or *Writing involves many different elements*.) are too global to provide useful and transferable insights into important ideas. A practical tip: Check to see that your stated understandings do not end in an adjective (e.g., *Fractions are important)*.

Frame the desired understanding as a full-sentence generalization in response to the phrase, *"Students will understand that..."*

❏ State *specifically* what it is about the topic that students are expected to grasp. Many curricular frameworks, content standards documents, and teacher objectives make the mistake of framing "understandings" as a topic (e.g., *Students will understand the water cycle*.) or skill (e.g., *Students will understand how to multiply.)*.

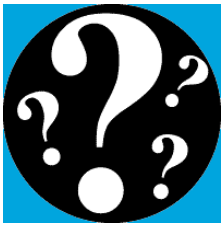
❏ We recommend that you summarize the *particular* understanding(s) you are after, being as specific as possible about the insights that should result from exploring the topic (e.g., *Data analysis and graphic displays often reveal helpful patterns and enable prediction*.).

❏ A practical way to accomplish this is to frame the understanding(s) in response to the stem: "*the students will understand that...*" (e.g., *The Civil War was fought initially over states rights issues and regional economic politics, not just the morality of slavery.)*. This approach helps to clarify the desired generalizations that we want students to come to understand, while avoiding the problems of stating the understanding in terms of a topic or skill.

Revising Understandings

Original Draft *Students will understand that…*	**Commentary**	**Revision**	**Commentary**
the three branches of government	Not an understanding – just states the topic, not the desired under standing about that topic.	Our founders believed in limited and divided government in order to curb the threat of absolute power and governmental overreach.	The revised understanding is both a transferable generalization and the result of the history of monarchies.
they should eat right and live healthy lives.	This understanding is a truism. on its face. It is fairly obvious and does not require in-depth thinking to grasp it.	We are what we eat.	A more focused understanding that should encourage discussion and further inquiry in order to uncover the insights in the statement.
different countries have different cultures.	While this is an under standing that may not be obvious to younger students, the claim is so vague that it isn't clear where this leads in terms of specific inquiry and insight.	Cultures develop unique traditions and norms around universal human needs such as food, clothing and shelter.	The revised understanding provides greater focus about the inquiry and learning in the unit, and hints at an important paradoxical insight: cultures develop differently around universal human needs.
force makes things move.	A superficial and imprecise a statement of the desired understanding.	F = ma	Newton's 2nd Law is a profound, concise and more focused understanding.
many linear relation ships can be found in the world.	As stated, it is more of a fact than a useful insight drawn from inference.	If you find a relationship in which 2 variables are related to each other in a constant ratio, the relationship can be represented graphically by a straight line.	The revised understanding, describes the general class of relationships called 'linear' and how to find them. (Note that this is not true by definition: it must be inferred from the experience with such relationships)

ESSENTIAL QUESTIONS



Definition

Open-ended questions designed to promote sustained inquiry and meaning making. Essential questions differ in scope and breadth. We distinguish between overarching and topical questions. **Overarching** essential questions point beyond the particulars of a unit to the larger, transferable ideas and enduring understandings that cut across topics. They recur fruitfully across the grades, spiraling throughout the curriculum to provide conceptual through lines. Effective overarching essential questions:

- are broad and general in nature; and
- lead to overarching understandings

Topical essential questions are more specific. They guide the exploration of ideas and processes within particular topics within a unit of study.

Essential questions are identified in Stage 1 for the purpose of:

1. Provoking deep thought, lively discussion, sustained inquiry, and additional questions leading to new and/or deeper insight(s).
2. Asking students to consider alternatives, weigh evidence, support their ideas and rethink key ideas.
3. Support connections within and across content and context.

Examples

Overarching Essential Questions	Topical Essential Questions
Visual Art • *In what ways does art reflect culture as well as shape it?* • *How do artists choose tools, techniques, and materials to express their ideas?* **English/Language Arts** • *What makes a great story?* • *How do effective writers hook and hold their readers?*	**unit on masks** • *What do masks and their use reveal about the culture? What tools, techniques, and materials are used in creating masks from different cultures?* **unit on mysteries** • *What is unique about the mystery genre?* • *How do great mystery writers hook and hold their readers?*

Concept Attainment – Essential Questions

Part 1 - Examine the following examples and non-examples to determine the common characteristics of Essential Questions. List these in the box below.

Essential Questions	Not Essential Questions
1. How are "form" and "function" related in biology?	7. How many legs does a spider have? How does an elephant use its trunk?
2. How do effective writers hook and hold their readers?	8. What is "foreshadowing"? Can you find an example of "foreshadowing'" in the story?
3. Who "wins" and who "loses" when technologies change?	9. What is the original meaning of the term, technology (from its Greek root, "techne")?
4. Should it be an axiom if it is not obvious?	10. By what axioms are we able to prove the Pythagorean theorem?
5. What distinguishes fluent foreigners from native speakers?	11. What are some French colloquialisms?
6. How would life be different if we couldn't measure time?	12. How many minutes are in an hour? How many hours are in a day?

List common characteristics of the Essential Questions:

Part 2 - Use your list of characteristics as criteria to determine which of the following are Essential Questions. Check "yes" or "no" after each example.

	YES	*NO*
13. What is the relationship between popularity and greatness in literature?	___	___
14. When was the Magna Carta signed?	___	___
15. Crustaceans – what's up with that?	___	___
16. To what extent are common sense and science related?	___	___
17. Which modern U.S. president will have the most disappointing legacy?	___	___
18. What's the pattern?	___	___

Refine your list of key characteristics of Essential Questions:

Essential Questions

examples

Arithmetic (numeration)
- What is a number?
- Why do we have numbers? What if we didn't have numbers?
- Can everything be quantified?

Arts (visual and performing)
- Where do artists get their ideas?
- How does art reflect, as well as shape, culture?
- Do you like that (artwork)?

Culinary Arts
- When is it o.k. to deviate from the recipe?
- What makes a "safe" kitchen?

Dance
- How and what can we communicate through the "language" of dance?
- In what ways can motion evoke emotion?

Economics
- What determines value?
- Can macro-economics inform micro-economics (and vice-versa)?

Foreign/World Language
- What distinguishes a fluent foreigner from a native speaker?
- What can we learn about our own language and culture from studying another?

Geography
- What makes places unique and different?
- How does *where* we live influence *how* we live?

Government
- Who should decide?
- How should we balance the rights of individuals with the common good?

Health
- What is "healthful" living?
- How can a diet be healthy for one person and not another?

Essential Questions

examples

History
- Whose "story" is it?
- How do we know what to believe about historical claims?
- What can we learn from the past?

Literature
- What makes a "great" book/story?
- What "truths" can fiction reveal? Should a story teach you something?

Mathematics
- When is the "correct" answer not the best solution?
- What are the limits of mathematical representation/modeling?

Music
- How are sounds and silence organized in various musical forms?
- If practice makes perfect, what makes "perfect" practice?

Physical Education/Athletics
- Who is a "winner?"
- Is pain necessary for progress in athletics? ("No pain, no gain" – agree?)

Reading/Language Arts
- How does *what* you read influence *how* you should read it?
- How do you read "between the lines?"
- Why do we punctuate? What if we didn't have punctuation marks?

Science
- To what extent are science and common sense related?
- How are "form" and "function" related in biology?

Technology
- In what ways can technology enhance research and communication? In what ways might technology hinder them?
- What are the pros and cons of technological progress?

Writing
- How do effective writers hook and hold their readers?
- How does audience and purpose influence writing style?
- What is a "complete" thought?

What Makes an Essential Question?

Questions that meet all or most of the following criteria qualify as "essential." An essential question:

1) is open-ended; i.e., it typically will not have a single, final, and correct answer.
Essential questions yield inquiry and argument -- a variety of plausible (and arguable) responses, not straightforward facts that end the matter. They should *uncover* rather than cover (up) the subject's controversies, puzzles, and perspectives.

2) is thought-provoking and intellectually engaging, often sparking discussion and debate.
Essential Questions work best when they are designed and edited to be thought-provoking to students, engaging them in sustained, focused inquiries. Such questions often involve the counter-intuitive, the visceral, the whimsical, the controversial, the provocative. *Is the Internet dangerous for kids? Are censorship and democracy compatible? Does food that is good for you have to taste bad?*

3) calls for high-order thinking, such as analysis, inference, evaluation, prediction. It cannot be effectively answered by recall alone (or via a Google search).
Their aim is to stimulate thought, to provoke inquiry, and to spark more questions, including thoughtful student questions, not just pat answers. They serve as doorways into focused yet lively inquiry and research. They are intended to result in conclusions drawn by the learner, not recited facts.

4) points toward important, transferable ideas within (and sometimes across) disciplines.
Essential questions reflect the most historically important issues, problems and debates in a field of study. *Is history inevitably biased? What is a proof? Nature or nurture?* By examining such questions, students are engaged in thinking like an expert (i.e., "doing" the subject).

5) raises additional questions and sparks further inquiry.
Thought-provoking essential questions are naturally generative. They lead to other important questions within, and sometimes across, subject boundaries. For example: *In nature, do only the strong survive?* leads to other questions and inquiries into human biology and the physics of physiology. *What do we mean by "strong?" Are insects strong (since they are survivors)?*

6) requires support and justification, not just an answer.
Essential questions are intended to elicit a variety of plausible (and arguable) responses. Students are expected to provide reasons and evidence. Thus, teachers pose follow-up prompts; e.g., *Why?, What's your reasoning? Who agrees? Who disagrees? What's another way of viewing this?*

7) recurs over time; i.e., the question can and should be re-visited again and again.
These are questions that are not answerable with finality in a single lesson or brief sentence – and that's the point. The same important questions get asked and re-asked throughout one's learning and in the history of the field. For example: *What makes a great book great? Are the Harry Potter novels great books?* can be productively examined and re-examined by first graders as well as college students. Over time, student responses become more sophisticated, nuanced, and well-reasoned.

Essential Questions in Two Strands

Every discipline is made up of two strands: a **content** strand containing facts, concepts and principles and a **procedural** strand that harbors key skills and processes. Accordingly, there are essential questions for both strands. Here are examples for various disciplines:

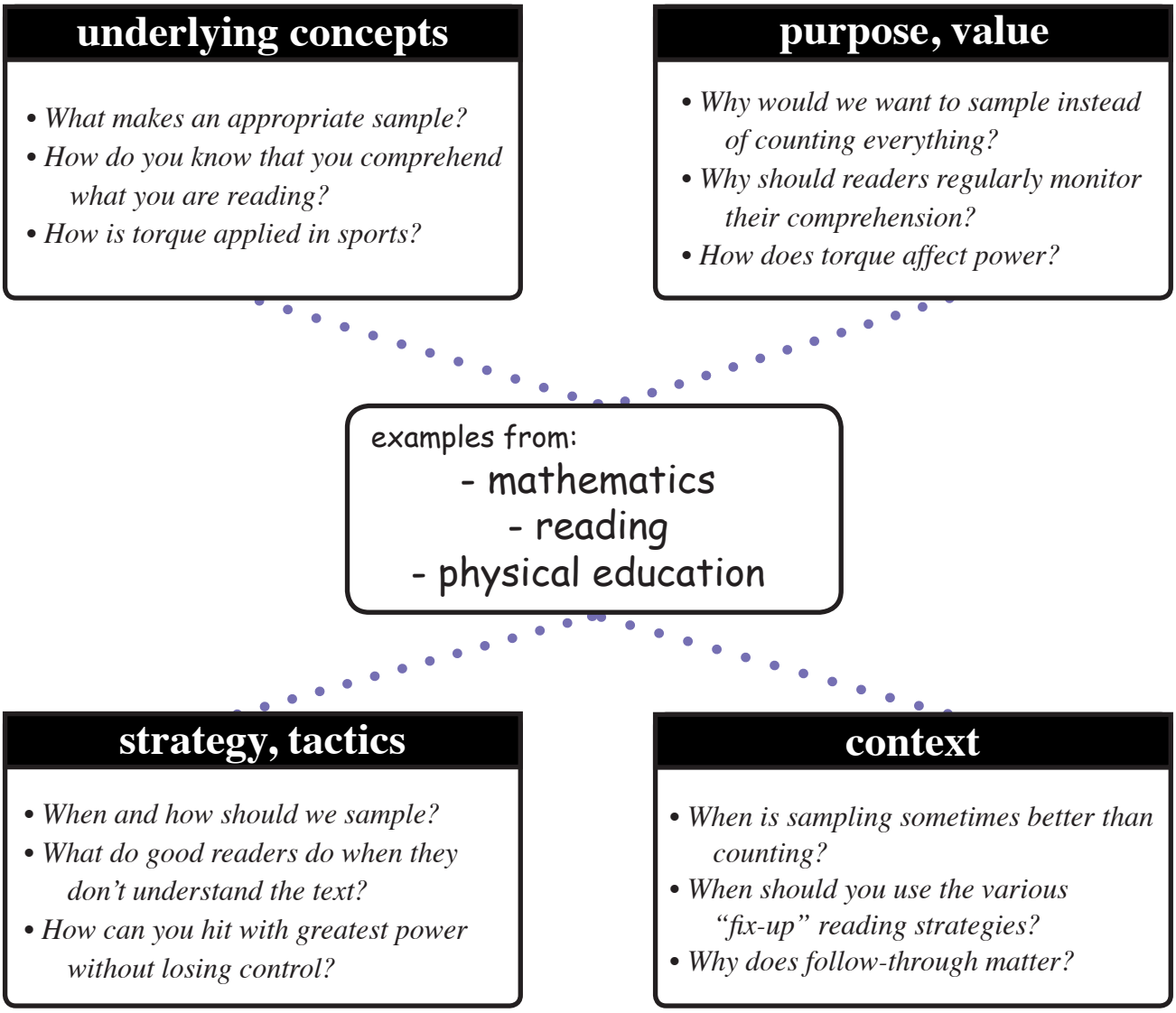
Content (Concepts)	Processes
Social Studies	
• How should we balance individual rights with the common good? • Does capitalism insure economic inequality?	• How do we know what to believe about historical claims? • Whose "story" is this?
English/Language Arts – Reading	
• What "truths" can we learn from fiction? • Can anyone be a hero?	• How does what I read influence how I should read it? • How do you read "between the lines"?
Mathematics	
• What do numbers show? • What are the limits of this model (e.g., a linear equation)?	• What do good problem solvers do? • What makes an answer reasonable?
Science	
• How has the earth changed over time? • How are structure and function related in nature?	• How do scientific theories change?? • How can we know what to believe about a scientific claim?
Visual & Media Arts	
• How do the arts reflect and shape culture? • How and why do artists break with tradition?	• How do tools and materials influence artistic expression? • How can/should we "read" a work of art?
Physical Education & Athletics	
• When and why should we change the rules? • Why and how do we "create space" when on offense?	• No pain, no gain – agree? • If practice makes perfect, what makes "perfect" practice?

Essential Questions in Skill Areas

There is a common misunderstanding among many educators that teaching for understanding of "big ideas" are not really central to the teaching of skill-focused areas, such as beginning literacy, physical education, and mathematics. On the contrary: everything we know about learning tells us that that teaching for conceptual understanding is essential to more accurate and efficient skill performance. Essential questions in skill areas may be considered in terms of the following categories:

- **key concept(s)** – *What are the "big ideas" underlying effective skill performance?*
- **purpose, value** – *Why is the skill important?*
- **strategy, tactics**– *What strategies do skilled performers employ? How can skill performance become more efficient and effective?*
- **context** – *When should you use the skill?*

Use the space below to brainstorm possible essential questions for important skills.



Revising Essential Questions

Original Draft	Commentary	Revision	Commentary
Are there any benefits from the deforestation of the rain forests?	The question calls for some information gathering and analysis, but ends in a list.	*Do the benefits outweigh the costs of deforestation?*	The revised question broadens the inquiry and calls for a more sophisticated analysis; far more likely to spark debate and deeper inquiry into any list of pros and cons.
How does this diet match up with the USDA Guidelines?	The question requires some analysis and evaluation, but there is a "correct" answer.	*What should we eat?*	A much more open version with lots of inquiry and debate potential.
What is non-fiction?	A definitional question with an unambiguous answer.	*How much license does a writer of non-fiction have to make a point?*	This version of the question explores an interesting "grey" area having both historical and contemporary relevance.
Who speaks Spanish in our community?	A straightforward question asking for a list.	*How well can you thrive speaking only English?*	A more provocative version calling for greater analysis and a shift of perspective.
What is an axiom?	A straight-forward question calling for a "definitional" answer.	*Why should we assume that?*	A much more open question that gets at why some things are "given" even if they do not seem obvious or necessary.
What distinguishes Impressionist art?	A "leading" question with an expected set of characteristics.	*Why and how do artists break with tradition?*	These questions require an examination of artistic trends and call for a generalization by learners.
What types of exercises will improve fitness?	This question involves research but is leading-toward expected answers.	*"No pain, no gain" – agree?*	A more provocative question, likely to spark discussion, debate – and further inquiry.

Unpacking Standards - "Inside Out" Method

STANDARD

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Source: Common Core – College and Career Readiness Standards – Writing

Stated/implied "big ideas" in NOUNS:

- arguments
- claims
- topics or texts
- evidence
- reasoning

Stated/implied performances in VERBS:

- write
- support (claims)
- analyze (topics/texts)
- reasoning

ADJECTIVES and ADVERBS:

- valid
- relevant
- sufficient

Understandings

- The effectiveness of an argument is dependent upon the quality of the supporting evidence used (validity, appropriateness) and how it is conveyed.

Essential Questions

- *What makes an argument convincing?*
- *What is the best evidence I can use to support my argument?*
- *How do I best organize and present my argument?*

Transfer Goal(s)

produce clear and coherent writing to persuade a target audience

Performance Task(s)

Based on your reading of informational texts on a local or national issue, prepare a (report, letter to editor, essay) for a specific audience to convince them of your position. Your argument should follow a logical sequence with supporting evidence for your position (claim).

Criteria

- relevant evidence
- sufficient evidence
- valid reasoning

Unpacking Standards - "Inside Out" Method

STANDARD

Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

Source: Common Core – College and Career Readiness Anchor Standards – Reading

Stated/implied "big ideas" in NOUNS:

- ideas
- themes
- text
- development
- details

Stated/implied performances in VERBS:

- determine
- analyze
- summarize

ADJECTIVES and ADVERBS:

- central
- key
- supporting

Understandings

- Authors do not always state the central idea or theme overtly; readers have to infer it "between the lines."
- Effective readers use specific strategies to help them infer the implied main ideas of a text.

Essential Questions

- How can I to determine the central idea or theme of what I read?
- How can I read "between the lines" to determine the author's meaning?
- What strategies do effective readers use to make meaning from a text?

Transfer Goal(s)

Determine central ideas or themes of a text and analyze their development. Summarize the key supporting details

Performance Task(s)

- Prepare a "study guide" for students by summarizing the central ideas or key themes of a text.
- Use the "Adding up the Facts" organizer to show how supporting details lead to an inference about main ideas.

Criteria

- appropriate inference
- effective summary
- supported by key details

Unpacking Standards - "Inside Out" Method

STANDARD Model with Mathematics

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace....routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Source: Common Core State Standards – Mathematics

Stated/implied "big ideas" in NOUNS:

- mathematical model(s)
- "real life" problems
- disciplines and life

Stated/implied performances in VERBS:

- model
- apply
- solve
- interpret
- reflect on
- improve

ADJECTIVES and ADVERBS:

- makes sense
- serves its purpose

Understandings

- Mathematical models simplify and connect phenomena to assist in understanding and problem solving.
- Mathematical models must be viewed critically so that they do not mislead.
- Effective problem solvers always check for the reasonableness of solutions.

Essential Questions

- *How can I best model this phenomena in this situation?*
- *Do these results make sense?*
- *What are the limits of this mathematical model in this context?*
- *What do effective problem solvers do?*

Transfer Goal(s)

Apply the mathematics they know to develop mathematical models for solving real world problems

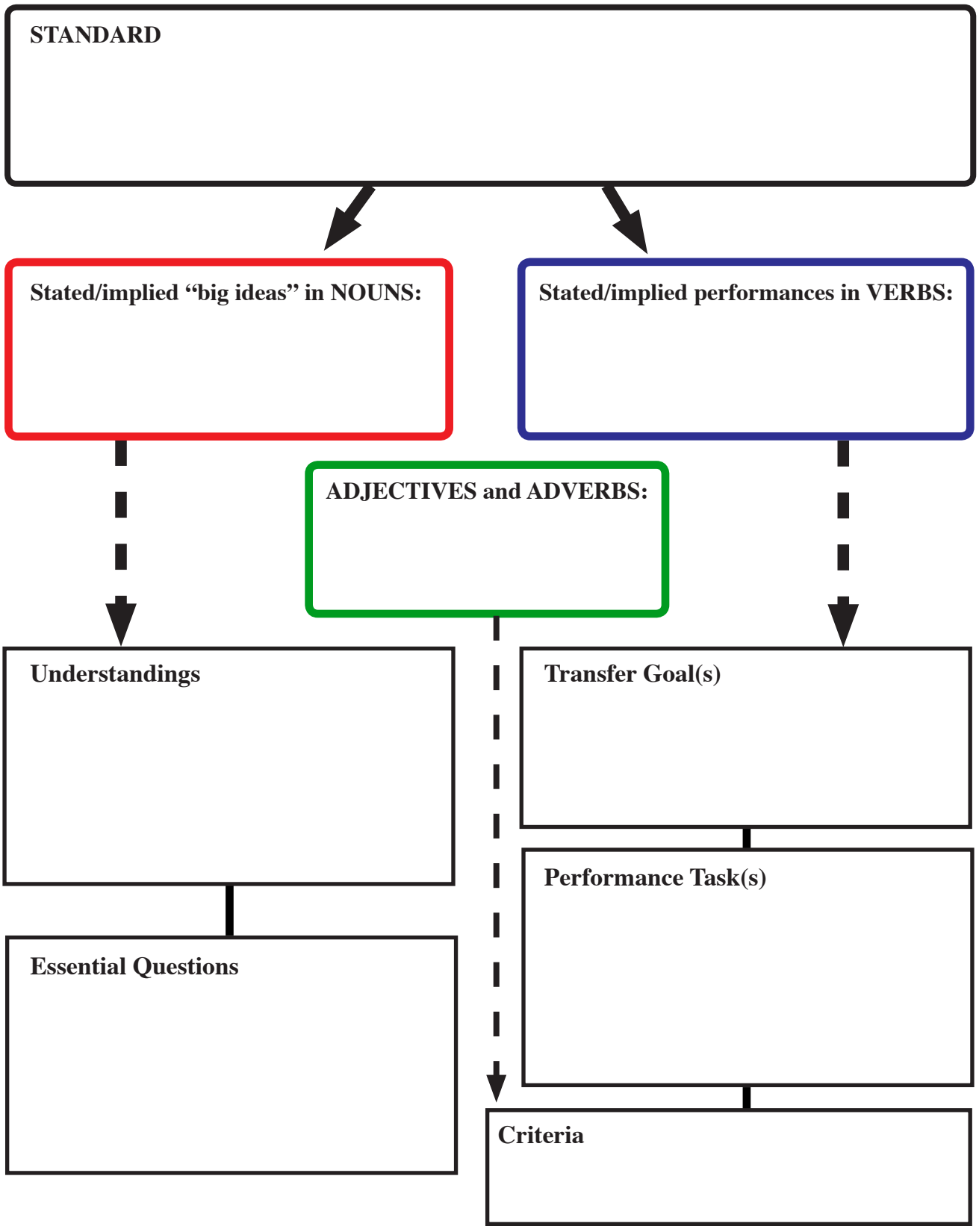
Performance Task(s)

- Create a mathematical model for a selected "real-world" situation (e.g., seasonal temperatures).
- Critically review and improve a mathematical model for its appropriateness to a given situation.

Criteria

- appropriate modeling
- accurate
- reasonableness of solution

Unpacking Standards - "Inside Out" Method



Sources of Assessment Evidence: Self Assessment

Directions: Use the following scale to rate your "level of use" of each of the following assessment tools (at the classroom, school or district level). What do the survey results suggest? What patterns do you notice? Are you collecting appropriate evidence for *all* the desired results, or only those that are easiest to test and grade? Is an important learning goal "falling through the cracks" because it is not being assessed?

4 = Frequent Use

3 = Use Sometimes

2 = Occasional Use

1 = Do Not Use

_____1. selected-response format (e.g., multiple-choice, true-false) quizzes and tests

_____2. written/oral responses to academic prompts (short-answer format)

_____3. performance assessment tasks, yielding:

____ extended written products (e.g., essays, lab reports)

____ visual products (e.g., Power Point show, mural)

____ oral performances (e.g., oral report, foreign language dialogues)

____ demonstrations (e.g., skill performance in physical education)

_____4. long-term, "authentic" projects (e.g., senior exhibition)

_____5. portfolios - collections of student work over time

_____6. reflective journals or learning logs

_____7. informal, on-going observations of students

_____8. formal observations of students using observable indicators or criterion list

_____9. student self-assessments

_____10. peer reviews and peer response groups

_____11. other: _____

A Collection of Assessment Evidence

(example - 4 week unit on Nutrition for grade 6)

Performance Tasks:

You Are What You Eat – Create a picture book to teach 1st graders about "healthful" eating and show at least 2 health problems that may result from poor nutrition.

Camp Menu – Design a "balanced" 3-day menu for meals and snacks for a weekend camping trip. Explain why your menu plan is both healthy and tasty.

Note: Both performance tasks will be evaluated with rubrics.

Other Evidence:
(e.g., tests, quizzes, prompts, work samples, observations, etc.)

Quiz on the food groups and their nutritional benefits

Skill Check on reading and interpreting nutrition information on food labels.

Unit Test on health problems caused by poor eating.

Student Reflection on Daily "eating" Journal -
- To what extent are you a "healthy" eater?
- What could you do to become more of one?

Performance Tasks

Performance tasks ask students to apply knowledge and skills to a new situation, and typically yield tangible products and performances that serve as evidence of learning. These tasks can be used as rich learning activities or as assessments. Performance tasks (as distinct from long-term projects) can usually be completed within a relatively short time frame, generally between one and four class periods. Here are general characteristics of performance tasks; they:

- demand thoughtful application of knowledge and skills, not just recall;
- yield tangible products and performances that serve as evidence of learning;
- establish authentic contexts for performance;
- can integrate two or more subjects as well as 21st century skills (e.g., critical thinking, technology use, teamwork);
- do not have a "single, best" answer or one, "right way" to accomplish the task;
- evaluate performance with established criteria and rubrics; and
- may be used as rich learning activities and/or assessments.

Performance tasks may be content-specific (e.g., mathematics, science, social studies) or integrated (i.e., involving two or more subjects). One natural interdisciplinary connection is to include a reading, research and/or communication (writing, graphics, presentation) component to tasks in content areas. Such tasks encourage students to see meaningful learning as integrated, rather than something which occurs in isolated segments.

Two examples of performance tasks are provided below.

Fairy Tales [grades 3-4]

You have just finished reading three fairy tales that all have the same general pattern – characters overcoming a confrontation with an animal when the animal's intent is to harm the character(s). Your task is to write a story that includes all the characteristics of a fairy tale and also uses this same general pattern. You will then read your story to your kindergarten reading buddy and teach him/her about the characteristics and general pattern of a fairy tale.

Source: Assessing Outcomes: Performance Assessment Using Dimensions of Learning

City Park [high school physics]

Your design team has been asked by the City Park Department to construct a model for a new playground near the elementary school. The playground will have swing sets and see-saws. For the safety of the children who will be using the playground equipment, you must design your swings so that they don't swing too fast or "loop-the-loop " over the top of the swing set.

Design and conduct an experiment to determine how the variables - length, mass, height of release - affect the rate of back-and-forth movement of a swing. Be prepared to present your findings, recommendations, and a demonstration to the City Park officials.

Source: A Tool Kit for Professional Developers: Alternative Assessment

Performance Task Review Criteria

KEY TO RATINGS: 3 = *extensively* 2 = *somewhat* 1 = *not yet*

CRITERIA

1. The task aligns with targeted standard(s)/outcome(s) and one or more of the 4C's – critical thinking, creativity, communication, collaboration.	**3**	**2**	**1**
2. The task calls for understanding and transfer, not simply recall or a formulaic response.	**3**	**2**	**1**
3. The task requires extended thinking and habits of mind – not just an answer.	**3**	**2**	**1**
4. The task is set in an "authentic" context; i.e., includes a realistic purpose, a target audience, and genuine constraints.	**3**	**2**	**1**
5. The task includes criteria/rubric(s) targeting distinct traits of understanding and successful performance; i.e., criteria do not simply focus on surface features of a product or performance.	**3**	**2**	**1**
6. The task directions for students are clear.	**3**	**2**	**1**
7. The task will be feasible to implement.	**3**	**2**	**1**

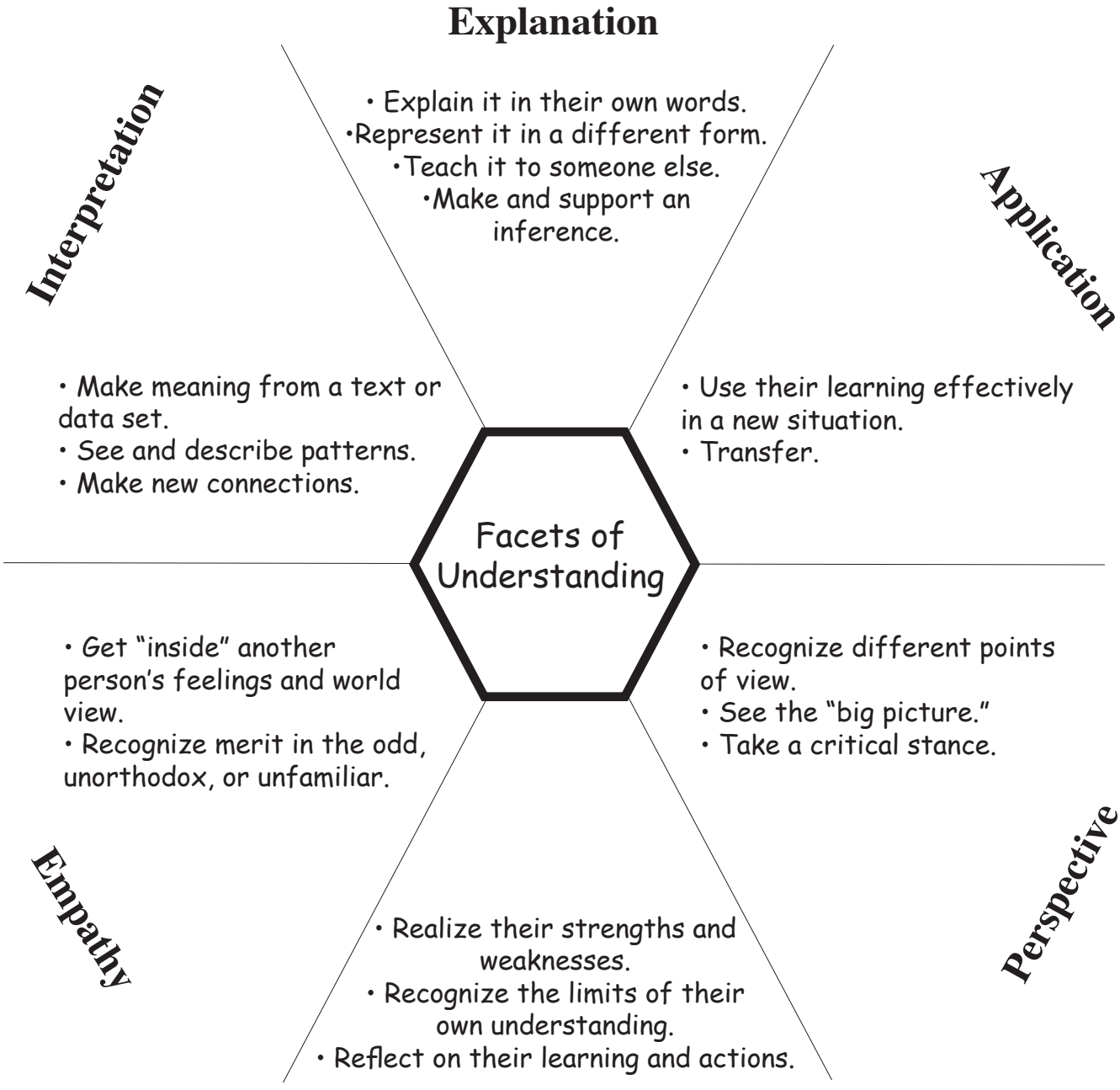
Optional:

8. The task allows students to demonstrate their understanding/ proficiency with some appropriate choice/variety (e.g., of products or performances).	**3**	**2**	**1**
9. The task effectively integrates two or more subject areas	**3**	**2**	**1**
10. The task incorporates appropriate use of technology.	**3**	**2**	**1**
Other: _____	**3**	**2**	**1**

The Facets of Understanding

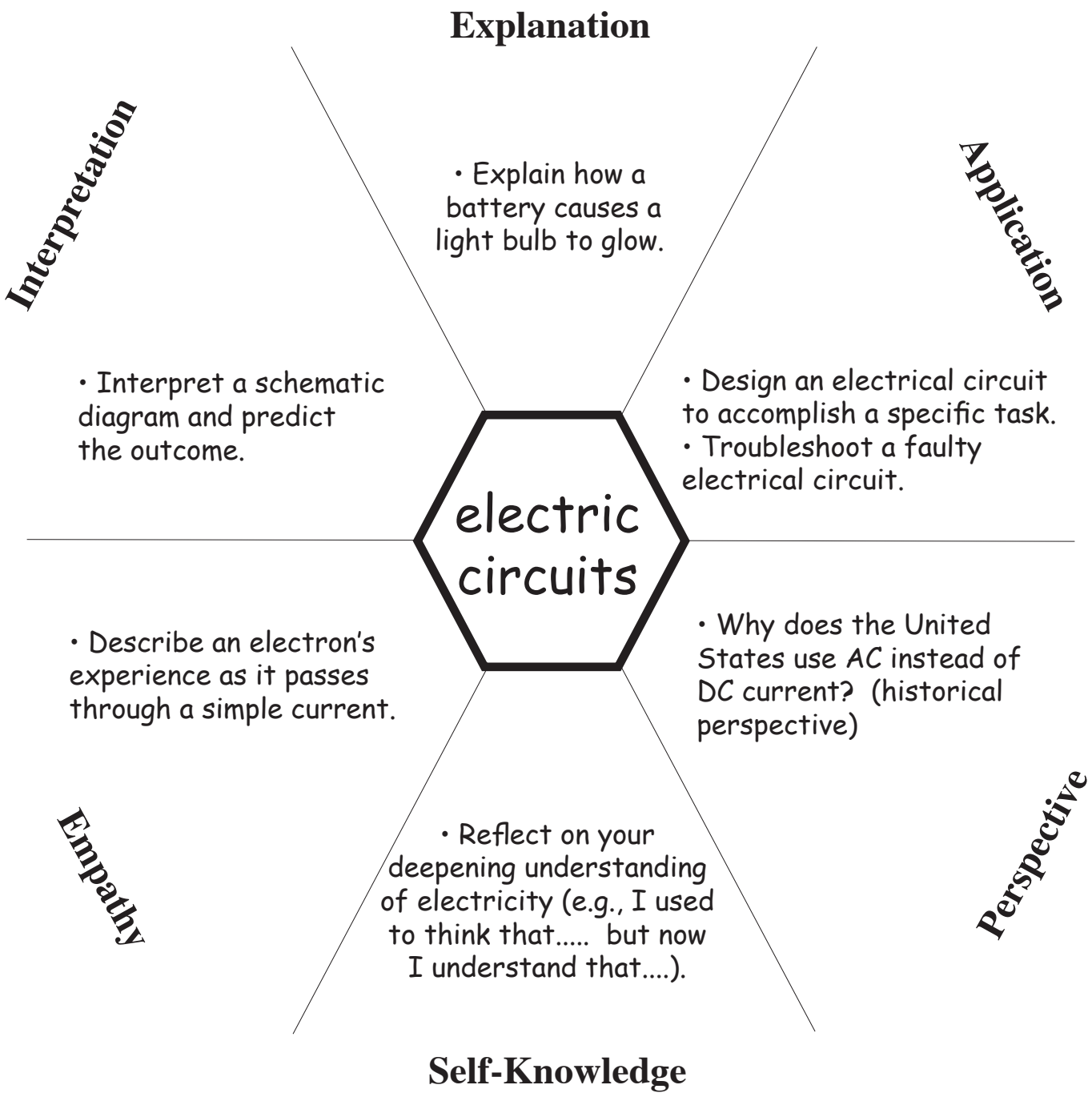
The facets of understanding provide *indicators* of understanding and thus can be used to select or develop assessments.

If someone really understands something, they can...



Brainstorming Assessment Ideas Using the Facets

Use the six facets of understanding to generate possible ways in which students might reveal understanding.



Questioning for Understanding using the Facets

Explanation
What is the key idea in _____?
What are examples of _____?
What are the characteristics/parts of _____?
How did this come about? Why is this so?
What caused _____? What are the effects of _____?
How might we prove/confirm/justify _____?
How is _____ connected to _____?
What might happen if _____?
What are common misconceptions about _____?

Interpretation
What is the meaning of _____?
What are the implications of _____?
What does _____ reveal about _____?
How is _____ like _____ (analogy/metaphor)?
How does _____ relate to me/us?
So what? Why does it matter?

Application
How and when can we use this (knowledge/process)?
How is _____ applied in the larger world?
How might _____ help us to _____?
How could we use _____ to overcome _____?

Perspective
What are different points of view about _____?
How might this look from _____'s perspective?
How is _____ similar to/different from _____?
What are other possible reactions to _____?
What are the strengths and weaknesses of _____?
What are the limits of _____?
What is the evidence for _____?
Is the evidence reliable? sufficient?

Empathy
What would it be like to walk in _____'s shoes?
How might _____ feel about _____?
How might we reach an understanding about _____?
What was _____ trying to make us feel/see?

Self-Knowledge
How do I know _____?
What are the limits of my knowledge about _____?
What are my "blind spots" about _____?
How can I best show _____?
How are my views about _____ shaped by _____
(experiences, habits, prejudices, style)?
What are my strengths and weaknesses in _____?

Performance Verbs

based on the Six Facets of Understanding

Consider the following "performance verbs" when planning possible ways in which students may demonstrate their understanding. (See the design tool on the next page.)

explain

demonstrate
derive
describe
design
exhibit
express
induce
instruct
justify
model
predict
prove
show
synthesize
teach

interpret

create analogies
critique
document
evaluate
illustrate
judge
make sense of
make meaning of
provide metaphors
read between the lines
represent
tell a story of
translate

apply

adapt
build
create
decide
de-bug
design
exhibit
invent
perform
produce
propose
solve
test
troubleshoot
use

perspective

analyze
argue
compare
contrast
criticize
infer

empathy

be like
be open to
believe
consider
imagine
relate
role-play

self-knowledge

be aware of
realize
recognize
reflect
self-assess

Depth of Knowledge

Dr. Norman Webb developed the Depth of Knowledge (DOK) framework to distinguish four levels of rigor and cognitive complexity. The DOK framework provides a common language and a frame of reference to help educators understand "rigor," or cognitive demand, in assessments, as well as curricular units, lessons, and tasks. Many State Departments of Education have used the DOK Framework in developing state assessments. Here is a summary of the four levels of the DOK Framework.

Level 1
- Require students to recite or recall information including facts, formulae, or simple procedures.
- May require students to demonstrate a rote response, use a well-known formula, follow a set procedure (like a recipe), or perform a clearly defined series of steps.
- Typically focus on a "correct" answer.

Level 2
- Focus on application of basic skills and concepts.
- Involve some reasoning beyond recall.
- Require students to perform two or more steps and make some decisions on how to approach the task or problem.

Level 3
- Require strategic thinking and reasoning applied to situations that generally do not have a single "right" answer.
- Require students to go beyond the information given to generalize, connect ideas, evaluate, and problem solve.
- Expect students to support their interpretations and conclusions with evidence and to "explain their thinking."

Level 4
- Require extended thinking and complex reasoning over an extended period of time.
- Expects students to transfer their learning to novel, complex and "messy" situations.
- Requires students to devise an approach among many alternatives for how to approach the task or problem.
- May require students to develop a hypothesis and perform complex analysis.

Webb's Depth of Knowledge for
Reading and Mathematics

DOK Level	Reading Tasks require:	Mathematics Tasks require:
1	• verbatim recall of a text • only basic, literal comprehension • basic paraphrasing of specific details from the text • support for ideas by reference to details from the text • use of a dictionary to find the meanings of words	• recalling information (e.g., a math fact or definition) • performing a one-step, well-defined procedure (e.g., an algorithm or formula) • "plug in" numbers into a given algorithm • follow a set procedure with a clearly defined series of steps
2	• some inference/interpretation of textual information • summary of main idea(s) • prediction of an outcome based on text information • use of context cues to identify the meaning of unfamiliar words	• applying some mathematical reasoning to: - multi-step, yet routine, problems - one-step, simple word problems • collecting, classifying, organizing, and comparing simple data • organizing and displaying simple data in tables, graphs, and charts • interpreting non-complex numerical information
3	• comprehension and interpretation of abstract ideas (e.g., metaphor, analogies) • going beyond the literal text by summarizing, generalizing and connecting ideas from multiple sources • support for inference/interpretation with textual evidence and reasoning • critical analysis; for example, - author's style in literature - distinguishing fact and opinion - recognizing bias or flawed reasoning	• application of sound mathematical reasoning to multi-step, non-routine problems • analysis of problem situations (e.g., determining what information is needed) • explanation of one's thinking and reasoning • interpreting complex numerical or statistical information • making and supporting mathematical conjectures • perseverance
4	• transfer – applying ideas/information from a given text to a new task • developing hypotheses and performing complex analyses across texts • analyzing and synthesizing information from multiple sources • evaluating alternative perspectives across multiple sources • extracting common ideas/themes across texts from different times and cultures	• application of sound mathematical reasoning to confront complex, ill-structured problem situations • complex analytical and creative thinking • strategic planning • transferring mathematical concepts and process to new contexts (e.g., in science) • interpreting complex numerical or statistical information from multiple sources • lots of perseverance!

Matrix Method -- Mathematics Common Core Standards

Practice Standards MATH GR 3 **Content Standards**	*1 Make sense of problems and persevere in solving them.*	*2 Reason abstractly and quantitatively.*	*3 Construct viable arguments and critique the reasoning of others.*	*4 Model with mathematics.*	*5 Use appropriate tools strategically.*	*6 Attend to precision.*	*7 Look for and make use of structure.*	*8 Look for and express regularity in repeated reasoning.*
Represent and solve problems involving multiplication and division.								
Understand properties of multiplication and the relationship between multiplication and division.								
Multiply and divide within 100.								
Solve problems involving the four operations, and identify and explain patterns in arithmetic.								
Use place value understanding and properties of operations to perform multi-digit arithmetic.								
Develop understanding of fractions as numbers.								
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.								
Represent and interpret data.								
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.								
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.								
Reason with shapes and their attributes.								

Performance Task Examples

Examine the performance task vignettes on the following pages. What distinguishes these tasks from typical test "items"? What common features or characteristics do these share?

Painting a Schoolroom – *Mathematics, grades 7-9*

When contractors give us an estimate on repairs, how can we know if the cost is reasonable? You have been asked by the Principal to review a painting contractor's proposal to determine whether s/he is being overcharged. (Students are given room dimensions and cost figures for materials, labor, and a 20% profit.)

Examine the proposal and write a letter to the Principal providing your evaluation of the proposal. Be sure to show your calculations so that s/he will understand how you arrived at your conclusion.

Mail-Order Friend – *Language Arts, grades K-2*

Imagine that you have an opportunity to "order" a friend by telephone from a mail-order catalog. Think about the qualities that you want in a friend. Before you "order" your friend over the telephone, practice asking for three characteristics that you want in a friend and give an example of each characteristic. Remember to speak clearly and loud enough so that the sales person will know exactly what to send.

From the Mountains to the Seashore – *History, Geography, Math, grades 5-8*

A group of nine foreign students is visiting your school for one month as part of an international exchange program. (Don't worry, they speak English!) The principal has asked your class to plan and budget a four-day tour of [your state or province] to help the visitors understand the state's impact on the history and development of our nation. Plan your tour so that the visitors are shown sites that best capture the ways that [your state or province] has influenced thenation's development.

You should prepare a written tour itinerary, including an explanation of why each site was selected. Include a map tracing the route for the four-day tour and a budget for the trip.

Spot Remover – *Science, Middle School*

Chris wants to decide which of two spot removers is best. First, he tried Spot Remover A on a T-shirt that had fruit stains and chocolate stains. Next, he he tried Spot Remover B on jeans that had grass stains and rust stains. Then he compared the results.

Explain what did Chris do wrong that will make it hard for him to know which spot remover is best. Redesign the experiment to help him determine the best spot remover.

Performance Task Examples

Find the Best Deal – *Mathematics, High School*

Your friend has told you that he has just upgraded his cell phone plan with BS&S. The plan offers unlimited calls and texts for a fixed monthly fee. Your current plan is based on a price per call (in minutes) and text (mbs). He insists that his new plan is the best plan available and you should choose this same plan. Is he correct in his assumption that this is the best plan for you? Why or why not? Explain your position, cite your mathematical reasons, and show table(s)/graph(s) and equation(s) to support your recommendation.

Pulse Rate – *Science, grade 6-9*

Design and conduct an investigation to answer the question, How does exercise affect the pulse rate? Compare normal pulse rate to changes caused by two selected physical activities (e.g., jogging, push-ups, squats, swimming) for designated intervals. Prepare a report to explain the results to other students in a news article, graphic, e-mail or other appropriate media.

Active Citizen – *Social Studies, Language Arts, grade 4-9*

You have an idea that you believe will make your school/community better, and you want to convince school/community leaders that they should act on your idea. Identify your audience (e.g., principal, PTSA Board, students, city counmcil, citizens) and:

- Describe your idea.
- Explain why & how it will improve the school/community.
- Develop a plan for acting on your idea.

Your idea and plan can be communicated to your target audience in a letter, e-mail, public service announcement or presentation.

Pooper Scooper – *Science, grade 4-6*

The Pooper Scooper Kitty Litter Company claims that their litter is 40% more absorbent than other brands. You are a Consumer Advocates researcher who has been asked to evaluate their claim. Develop a plan for conducting the investigation. Your plan should be specific enough so that the lab investigators could follow it to evaluate the claim.

Performance Task Examples

Hall of Recognition – *Social Studies, Language Arts, grade 4-5*

The state has announced the establishment of a Hall of Recognition to honor the contributions of local citizens to their community, the state or the nation. Since you are learning about famous individuals from _____, you have been asked to nominate a candidate who you believe would be worthy of admission to the Hall.

Your task is to select and research the life of your chosen individual. Submit a nomination letter to the Hall's selection committee explaining the reasons why your candidate should be included Hall of Recognition. Be sure to describe his/her accomplishments and the contributions they he/she has made.

How-To Guide – *E/LA; may include other content areas*

Since you are an accomplished user of _____ software (e.g., iMovie, Google Docs), you have been asked to develop a User's Guide or Tutorial to help _____ (e.g., fellow students, adults) learn to use it. Provide clear step-by-step directions for using specific features and include a Trouble-Shooting Guide for common problems that beginning users may encounter.

Chemical Equilibrium – *Chemistry, grades 11 - 12*

You are a researcher hired by a group of expert mountain climbers. Hypoxia is the set of symptoms (headache, fatigue, nausea) that comes from a lack of oxygen in body tissues. It is often felt by mountain climbers as they ascend altitude quickly. Sherpas, long-time residents of high altitudes, seem to feel no hypoxic discomfort. Why might that be? Your group wants to know, and to benefit from the knowledge.

Design a series of experiments that would test the difference in hypoxic symptoms between mountain climbers and sherpas. Explain, using chemical equilibrium, why high altitude causes hypoxia in the climbers. How can sherpas avoid these symptoms? How can you test for these possibilities? What would a positive test look like? What inherent errors would you have to be aware of?

Tour Director – *World Languages - Level 1*

You serve on a Welcome Committee to provide tours for new students. Plan a trip to three places (e.g., school, town, mall) in the new student's target language. Incorporate the following vocabulary: directions (left, right, near, far, next to, etc.), places (e.g., classrooms, cafeteria, gym, library, labs, churches, police and fire stations, schools, restaurants, stores) and transportation (e.g., bus, bike, stairs, escalators, taxi, train, car). Remember to include a variety of locations, directions, and forms of transportation on your "trips." Keep sentences simple and narrate in the target language.

The Literacy Design Collaborative Task Templates

Funded through the Bill and Melinda Gates Foundation, the Literacy Design Collaborative (LDC) has developed a set of Modules designed to support the integration of the Common Core Standards (6-12) in English/ Language Arts with core content in Science, Social Studies and Technical areas. Each Module consists of a task and associated instructional procedures intended to provide a rigorous, authentic classroom experience for students at the secondary level.

The Tasks require students to read, analyze, and comprehend written materials and then write cogent arguments, explanations, or narratives in the subjects they are studying. A key feature of the LDC's work is a set of generic Task Templates -- fill-in-the-blank "shells" that allow teachers to design their own tasks.

Here are several samples:

Argumentation Task Template

After researching _____ (informational texts) on _____ (content topic or issue), write a/an _____ (essay or substitute) that argues your position on _____ (topic, issue, essential question). Support your position with evidence from research. Be sure to acknowledge competing views. Give examples from from past or current events issues to illustrate and clarify your position.

Social Studies Example:
After researching academic articles on **censorship**, write a/an **blog or editorial** that argues your position on **the use of Internet filters by schools**. Support your position with evidence from research. Be sure to acknowledge competing views.

ELA Example:
What makes something something funny? After reading selections from **Mark Twain and Dave Barry**, write a **review** that **compares their their humor** and argues **which type of humor works for a contemporary audience and why**. Be sure to support your position with evidence from the texts.. Be sure to support your position with evidence from the texts.

Informational or Explanatory Task Template

[Insert question] After reading _____ (literature or informational texts), write a/an _____ (essay, report, article, or substitute) that defines and explains (term or concept). Support your discussion with evidence from the text(s). What _____ (conclusions or implications) can you draw?

Social Studies Example:
What did the authors of the American Constitution mean by "rights"? After reading the **Bill of Rights**, write an **essay** that defines **"rights"** and explains **"rights" as the authors use it in this foundational document**. Support your discussion with evidence from the text. What implications can you draw?

Constructing a Performance Task Scenario using G.R.A.S.P.S.

Consider the following set of stem statements as you construct a scenario for a performance task. Refer to the previous idea sheets to help you brainstorm possible scenarios. (Note: These are idea starters. Resist the urge to fill in all of the blanks.)

Goal :

- Your task is _____
- The goal is to _____
- The problem/challenge is_____
- The obstacle(s) to overcome is (are) _____

Role:

- You are _____
- You have been asked to _____
- Your job is _____

Audience:

- Your client(s) is (are) _____
- The target audience is _____
- You need to convince _____

Situation:

- The context you find yourself in is _____
- The challenge involves dealing with _____

Product/Performance and Purpose:

- You will create a _____

  in order to _____
- You need to develop _____

  so that _____

Success Criteria:

- Your performance needs to _____
- Your work will be judged by _____
- Your product must meet the following standards _____
- A successful result will _____

Constructing a Performance Task Scenario

G.R.A.S.P.S. example

Goal:

- **Your goal is to** help a group of foreign visitors understand the key historic, geographic and economic features of our region.

Role:

- **You are** an intern at the Regional Office of Tourism.

Audience:

- **The audience** is a group of nine foreign visitors (who speak English).

Situation:

- **You have been asked to** develop a plan, including a budget, for a four-day tour of the region. Plan your tour so that the visitors are shown sites that best illustrate the key historical, geographic and economic features of our region.

Product/Performance and Purpose:

- **You need to** prepare a written tour itinerary and a budget for the trip. You should include an explanation of why each site was selected and how it will help the visitors understand the key historic, geographic and economic features of our region. Include a map tracing the route for the tour.
  [Optional: Provide a budget for the trip.]*

Success Criteria:

- **Your** proposed tour plan **needs to include**...
  - an itinerary and route map
  - the key historical, geographic and economic features of the region
  - a clear rationale for the selected sites

  * accurate and complete budget figures

Constructing a Performance Task Scenario

G.R.A.S.P.S. example

Goal:

- **The goal (within the scenario) is to** minimize costs for shipping bulk quantities of M&Ms.

Role:

- **You are** an engineer in the packaging department of the M&M Candy Company.

Audience:

- **The target audience** is non-engineer company executives.

Situation:

- **You need to** convince penny-pinching company officers that your container design will provide cost-effective use of the given materials, maximize shipping volume of bulk quantities of M&Ms, and be safe to transport.

Product/Performance and Purpose:

- **You need to** design a shipping container from given materials for the safe and cost-effective shipping of the M&Ms. Then you will prepare a written proposal in which you include a diagram and show mathematically how your container design provides effective use of the given materials and maximizes the shipping volume of the M&Ms.

Success Criteria:

- **Your** container proposal should...
  - provide cost-effective use of the given materials
  - maximize shipping volume of bulk quantities of M&Ms
  - be safe to transport
- **Your** models must make the mathematical case.

Possible STUDENT ROLES and AUDIENCES

KEY: ROLES = R and AUDIENCES = A

___ actor
___ advertiser
___ artist/illustrator
___ author
___ biographer
___ board member
___ boss
___ boy/girl scout
___ businessperson
___ candidate
___ carpenter
___ cartoon character
___ cartoonist
___ caterer
___ celebrity
___ chairperson
___ chef/cook
___ choreographer
___ CEO
___ coach
___ community members
___ composer
___ clients/customer
___ construction worker
___ dancer
___ designer
___ detective
___ editor
___ elected official
___ embassy staff
___ engineer
___ expert (in _____)
___ eye witness
___ family member
___ farmer
___ filmmaker
___ firefighter
___ forest ranger
___ friend
___ geologist
___ government official
___ historian
___ historical figure
___ illustrator
___ intern
___ interviewer
___ inventor
___ judge
___ jury
___ lawyer
___ library patron
___ literary critic
___ lobbyist
___ meteorologist
___ museum director/ curator
___ museum goer
___ neighbor
___ newscaster
___ novelist
___ nutritionist
___ panelist
___ parent
___ park ranger
___ pen pal
___ photographer
___ pilot
___ playwright
___ poet
___ policeman/woman
___ pollster
___ radio listener
___ reader
___ reporter
___ researcher
___ reviewer
___ sailor
___ school official
___ scientist
___ ship's captain
___ social scientist
___ social worker
___ statistician
___ storyteller
___ student
___ taxi driver
___ teacher
___ t.v. viewer
___ tour guide
___ trainer
___ travel agent
___ traveler
___ t.v./movie character
___ tutor
___ viewer
___ visitor
___ website designer
___ zoo keeper

Possible Products and Performances

*What student **product(s)** and/or **performance(s)** will provide appropriate evidence of understanding and/or proficiency? The following lists offer possibilities. (Remember that student products and performances should be framed by an explicit purpose or goal and an identified audience.)*

Written

- ❍ advertisement
- ❍ biography
- ❍ blog
- ❍ book report/review
- ❍ brochure
- ❍ crossword puzzle
- ❍ editorial
- ❍ essay
- ❍ field guide
- ❍ historical fiction
- ❍ journal
- ❍ lab report
- ❍ letter
- ❍ log
- ❍ magazine article
- ❍ memo
- ❍ newscast
- ❍ newspaper article
- ❍ play
- ❍ poem
- ❍ position paper/ policy brief
- ❍ proposal
- ❍ questionnaire
- ❍ research report
- ❍ screen play
- ❍ script
- ❍ story
- ❍ test
- ❍ Tweet

Oral

- ❍ audiotape
- ❍ conversation
- ❍ debate
- ❍ discussion
- ❍ dramatization
- ❍ dramatic reading
- ❍ infomercial
- ❍ interview
- ❍ radio script
- ❍ oral presentation
- ❍ oral report
- ❍ poetry reading
- ❍ podcast
- ❍ puppet show
- ❍ rap
- ❍ skit
- ❍ speech
- ❍ song
- ❍ teach a lesson

❍ other: _____

❍ other

Visual

- ❍ advertisement
- ❍ banner
- ❍ book/CD cover
- ❍ cartoon
- ❍ collage
- ❍ computer graphic
- ❍ data display
- ❍ design
- ❍ diagram
- ❍ display
- ❍ drawing
- ❍ exhibit
- ❍ Face Book page
- ❍ flowchart
- ❍ flyer
- ❍ game
- ❍ graph
- ❍ map
- ❍ model
- ❍ movie
- ❍ Power Point/Prezi
- ❍ photograph(s)
- ❍ painting
- ❍ poster
- ❍ scrapbook
- ❍ sculpture
- ❍ storyboard
- ❍ vodcast
- ❍ web site

Considering Student Interests

Primary Grades (pre-K – 2)

- **animals/pets**
- **cartoons**
- **characters (in books, on t.v., etc.)**
- **community helpers**
- **dinosaurs**
- **five senses**
- **holidays**
- **planets/outer space**
- **plants**
- **seasons**
- **sharks**
- **weather/snow**
- **zoo**

Other:

- _____

Intermediate Grades (3 – 5)

- **archaeology**
- **books/literature**
- **computers - games**
- **disasters**
- **famous people**
- **friends**
- **games**
- **geography**
- **movies**
- **mysteries**
- **outer space**
- **sports**
- **television/t.v. shows**
- **video games**

Other:

- _____

Middle School (6 – 8)

- **amusement parks**
- **cell phones**
- **clothing/fashion**
- **computers – games, e-mail, IM**
- **disasters**
- **friends**
- **games**
- **jobs/earning money**
- **music/musical groups**
- **movies**
- **shopping**
- **social media**
- **sports**
- **television/t.v. shows**
- **video games**

Other: _____

High School (9 – 12)

- **automobiles/driving**
- **careers**
- **cell phones**
- **clothing/fashion**
- **colleges**
- **computers – games, e-mail, IM**
- **dating/romance**
- **friends**
- **music/musical groups**
- **jobs/earning money**
- **shopping**
- **social media**
- **sports**
- **travel /vacations**
- **video games**

Other: _____

Task Variables

The following variables could be considered when designing learning and performance tasks. The desired results, nature and needs of the students, the teacher's style, available resources (time, supplies, equipment, funds) and classroom feasibility.

Discipline-specific or Interdisciplinary

❍ single discipline ❍ two disciplines ❍ three or more disciplines

Student Choice – To what extent will students have choices regarding the following?

❍ task topic ❍ task activities ❍ process for completing task
❍ product(s)/performance(s) ❍ audience(s)

Access to Resources – Will all resources needed (information, supplies, equipment) be provided? To what extent will students be expected to gather information, provide their own supplies/equipment, etc.?

❍ all necessary information/ resources provided ❍ other: _____

Performance Mode – How will students work?

❍ individually ❍ pair/group (optional) ❍ pair/group (required)

Audience(s) for Student Product(s)/Performance(s) – To whom will students present their products and performances?

❍ teacher ❍ other school staff ❍ expert(s) ❍ parents/community
❍ peers (in class) ❍ other students ❍ other: _____

Time Frame – How long will students be involved in this task? Include time for presentations and evaluations.

❍ 1 – 2 class periods ❍ 3 – 5 periods ❍ other: _____

Degree of Scaffolding – To what degree will students be provided with instructional support (scaffolding) as they work on the task?

❍ no support ❍ some support, as needed ❍ extensive support

Evaluation of Student Product(s)/Performance(s) – Who will be involved in the evaluation of student products and performances?

❍ teacher ❍ other staff ❍ expert judge(s) ❍ external scorers
❍ student (self evaluation) ❍ peers ❍ other: _____

Options for Criterion-Based Evaluation Tools

KEY QUESTIONS

• *What is the **purpose** of this performance task or assignment (diagnostic, formative, summative)?*

• *What **evaluation tool** is most appropriate given the assessment purpose?*

❍ *performance list* ❍ *holistic rubric* ❍ *analytic rubric*
❍ *generic* ❍ *task specific*

• *What is the **range of the scale**?*

• ***Who will use** the evaluation tool (teachers, external scorers, students, others)?*
If students are involved, the tool should be written in understandable 'kid language'.

TYPES OF CRITERION-BASED EVALUATION TOOLS

	SCORING RUBRIC		PERFORMANCE LIST
	Holistic	Analytic	Analytic
Generic			
Task-Specific			

Performance List for Writing Fiction

Primary Level

	Terrific	O.K.	Needs Work
1. I have an interesting setting and characters for my story.			
2. The problem in my story will be clear to my readers.			
3. My story events are in order.			
4. The solution will be clear to my readers.			
5. I used many describing words to tell what is happening.			
6. My words “paint a picture.”			
7. I have a title that goes with my story.			

What will you try to do better the next time you write a story?

Four Categories of Criteria

Content – refers to the appropriateness and relative sophistication of the understanding, knowledge and skill employed.

Quality – refers to the overall quality, craftsmanship and rigor of the work.

Process – refers to the quality and appropriateness of the procedures, methods, and approaches used, prior to and during performance.

Result – refers to the impact, success or effectiveness of performance, given the purpose(s) and audience.

Example – Cooking a Meal

Here is an example in which all four types of criteria might be used to evaluate a meal in nine different ways:

Content

1. meal reflects knowledge of food, cooking, situation, and diners' needs and tastes
2. meal contains the appropriate, fresh ingredients
3. meal reflects sophisticated flavors and pairings

Quality

4. meal is presented in aesthetically appealing manner
5. all dishes are cooked to taste

Process

6. meal is efficiently prepared, using appropriate techniques
7. the two cooks collaborated effectively

Result

8. meal is nutritious
9. meal is pleasing to all guests

NOTE: While these four categories reflect common types of criteria, we do not mean to suggest that you must use all four types for each and every performance task. Rather, you should select the criterion types that are appropriate for the goals being assessed through the task and for which you want to provide feedback to learners.

Four Types of Performance Criteria

By what criteria should understanding performances be assessed? The challenge in answering is to ensure that we assess what is central to the understanding, not just what is easy to score. In addition, we need to make sure that we identify the separate traits of performance (e.g. a paper can be well-organized but not informative and vice versa) to ensure that the student gets specific and valid feedback. Finally, we need to make sure that we consider the different types of criteria (e.g. the quality of the understanding vs. the quality of the performance in which it is revealed). The chart below offers ideas for different types of criteria and their associated indicators.

content	process	quality	result
Describes the degree of knowledge of factual information or understanding of concepts, principles, and processes.	Describes the degree of skill/proficiency. Also refers to the effectiveness of the process or method used.	Describes the degree of quality evident in products and performances.	Describes the overall impact and the extent to which goals, purposes, or results are achieved.
accurate appropriate authentic complete correct credible explained justified important in-depth insightful logical makes connections precise relevant sophisticated supported thorough valid	careful clever coherent collaborative concise coordinated effective efficient flawless followed process logical/reasoned mechanically correct methodical meticulous organized planned purposeful rehearsed sequential skilled	attractive competent creative detailed extensive focused graceful masterful organized polished proficient precise neat novel rigorous skilled stylish smooth unique well-crafted	beneficial conclusive convincing decisive effective engaging entertaining informative inspiring meets standards memorable moving persuasive proven responsive satisfactory satisfying significant useful understood

What Is Exemplary Design for Learning?

1. Think back to your many prior experiences with well-designed learning, *both in and out of school*. What was the most **well-designed learning experience** you have ever encountered as a learner? What features of the design - *not* the teacher's style or your interests - made the learning so **engaging and effective**? (Design elements include: challenges posed, sequence of activities, resources provided, assignments, assessments, groupings, teacher's role, etc.).
   Briefly describe the design, below:

2. In sharing your recollections and analyses with your colleagues, build **a list of generalizations that follow** from the accounts. What do well-designed learning experiences have in common? In other words, what must be built in "by design" for any learning experience to be maximally e**ffective** *and* **engaging** for students?

The best designs for learning...

-
-
-
-
-
-
-

Seven Principles of Learning*

1. Learning with understanding is facilitated when new and existing knowledge is structured around the major concepts and principles of the discipline.
2. Learners use what they already know to construct new understandings.
3. Learning is facilitated through the use of metacognitive strategies that identify, monitor, and regulate cognitive processes.
4. Learners have different strategies, approaches, patterns of abilities, and learning styles that are a function of the interaction between their heredity and prior experiences.
5. Learners' motivation to learn and sense of self affects what is learned, how much is learned, and how much effort will be put into the learning process.
6. The practices and activities in which people engage while learning shape what is learned.
7. Learning is enhanced through socially supported interactions.

Principles of Instruction for Understanding*

Teaching for conceptual understanding in advanced mathematics and science courses:

1. Maintains students' focus on the central organizing themes and underlying concepts of the discipline.
2. Is based on careful consideration of what students already know, their ideas and ways of understanding the world, and the patterns of practice they bring into the classroom.
3. Focuses on detecting, making visible, and addressing students' often fragile, underdeveloped understandings and misconceptions.
4. Reflects an understanding of differences in students' interests, motivations, preferences, knowledge, and abilities.
5. Is designed to provide the appropriate degree of explicitness for the situation and the abilities of the learners.
6. Recognizes students' preferences for and varying abilities to process different symbol systems, such as language (written and spoken), images, and numerical representations, by employing multiple representations during instruction.
7. Engages students in worthwhile tasks that provide access to powerful mathematical and scientific ideas and practices; moves students to see past the surface features of problems to the deeper, more fundamental principles; and develops their conceptual understanding.
8. Structures learning environments in which students can work collaboratively to gain experience in using the ways of thinking and speaking used by experts in the discipline.
9. Orchestrates classroom discourse so that students can make conjectures, present solutions, and argue about the validity of claims, thus helping them explore old understandings in new ways, reveal misconceptions, and generalize and transfer their learning to new problems or more robust understandings.
10. Provides explicit instruction in metacognition as part of teaching in the discipline.
11. Uses various kinds of formal and informal formative assessments to monitor students' understanding and target instruction effectively.
12. Creates expectations and social norms for the classroom that allow students to experience success and develop confidence in their abilities to learn.

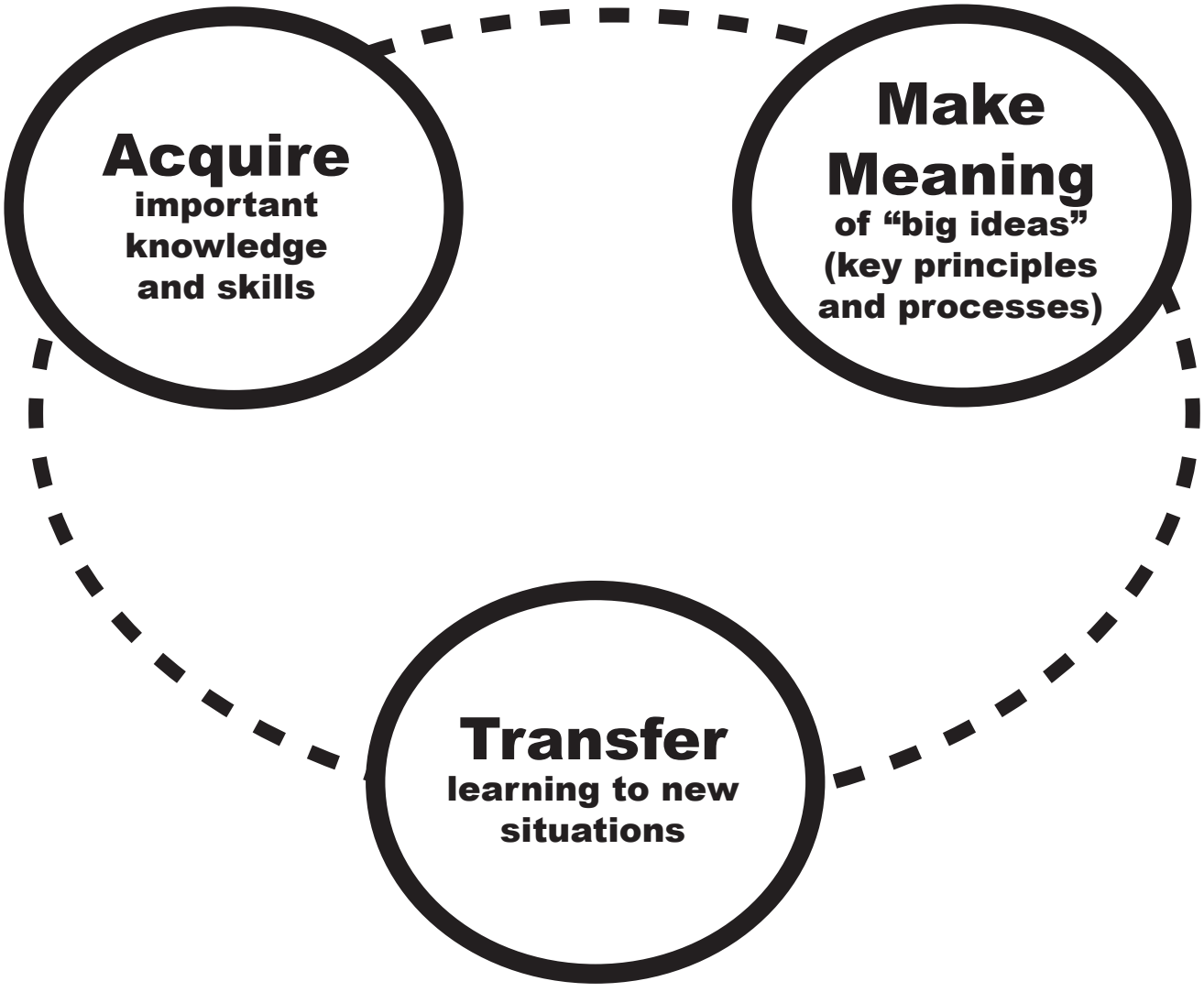
*Source: Committee on Programs for Advanced Study of Mathematics and Science in American High Schools

Teaching and Learning for Understanding

What does it mean to teach and learn for understanding?

We have found it useful to consider this question by examining three distinct, yet interrelated, learning goals: 1) acquisition of new information and skill, 2) making meaning of that content (i.e., coming to understand), and 3) transfer of one's knowledge (i.e., applying one's learning to new situations).

These three categories link directly to elements identified in *Understanding by Design*. In Stage 1 teachers specify the knowledge and skill that they intend students to **acquire**. They also decide upon the "big ideas" they want students to come to understand and develop essential questions to help students **make meaning** of those ideas. In Stage 2, teachers develop performance tasks requiring **transfer** as evidence that students understand and can apply their knowledge in authentic contexts.



What is Fair?

Who won this year's 7th grade race around the campus?
Every year Birdsong Middle School has a field day in which classes engage in various outdoor activities. One of the events is a 3/4 mile run around the perimeter of the campus. Below are the results for the four 7th grade classes. The data show the order of finishes for all of the 7th grade runners.

But there is a problem: The teachers never intended this as a competition, so they did not develop a method of calculating the winning class. However, the students want to know the winner!

What is the fairest way to determine which class should be declared winner?
Your group task is to review the order of finish data in the chart below and decide a FAIR way of deciding which class is the winner? Your group should discuss the problem, decide on a winning class, AND be prepared to explain your reasoning and defend your approach.

Class rank	Class A	Class B	Class C	Class D
1	4	6	1	2
2	9	7	3	5
3	11	10	14	8
4	12	13	18	15
5	20	16	19	17
6	21	22	23	31
7	25	24	28	33
8	26	27	30	36
9	29	34	32	37
10	35	39	41	38
11	43	40	44	46
12	45	42	47	51
13	49	48	50	55
14	54	52	56	57
15	61	53	60	58
16	65	62	63	59
17	69	66	64	67
18	70	72	68	
19	71		73	
20			74	

Notes on the chart:
• The numbers in the chart, from 1 to 74 represent the place of finish of that runner. So, the overall race winner was from Class C, the number two runner overall was in Class D, etc.
• Class rank refers to the rank of finish place in that class, not the overall race. So, the first runner in class A was 4th overall in the race, the 2nd best runner in class A came in 9th overall, etc.
• The blanks reflect the fact that each of the 4 classes has a different number of students.

Coding a Learning Plan Using A - M - T

A = acquiring basic knowledge and skills **M** = making meaning **T** = transfer

Mathematics Unit on Measures of Central Tendency

Essential Question: *What is fair - and how can mathematics help us answer the question?*

1. Introduce and discuss the essential question, first part - What is "fair"? What is "unfair'? **M**

2. Introduce the 7th grade race problem. Which of the 7th-grade classes won the race? What is a fair way to decide? Small-group inquiry, followed by class discussion of answers. **M**

3. Teacher informs students about the mathematical connections derived from the problem analysis, and lays out the unit and its culminating transfer task. **A**

4. In small-group jigsaw, students share their answers to the INQUIRY sheet, then return to their team to generalize from all the small-group work. Discuss other examples related to the concept of "fairness" such as the following. **M**
   - *What is a fair way to rank many teams when they do not all play each other?*
   - *What is a fair way to split up limited food among hungry people of very different sizes?*
   - *When is it 'fair' to use majority vote and when is it not fair? What might be fairer?*
   - *Is it fair to have apportioned Representatives based on a state's population, yet have two Senators from each state irrespective of their size? What might be fairer?*
   - *What are fair and unfair ways of representing how much money the "average" worker earns, for purposes of making government policy?*

5. Teacher connects the discussion to the next section in the textbook - measures of central tendency (mean, median, mode, range, standard deviation). **A**

6. Students practice calculating each type of measure. **A**

7. Teacher gives quiz on mean, median, mode from textbook. **A**

8. Teacher leads a review and discussion of the quiz results. **A M**

9. Group task worked on in class: What is the fairest possible grading system for schools to use? **M** T

10. Individuals and small teams present their grading policy recommendations and reasons. **M T**

11. Culminating transfer task: Each student determines which measure (mean, median or mode) should be used to calculate <u>their</u> grade for the marking period and writes a note to the teacher showing their calculations and explaining their choice. **T**

12. Students write a reflection on the essential question and their learnings as a result of the unit. **M**

Learning Goals and Teaching Roles

Three Interrelated Learning Goals →	**ACQUIRE**	**MAKE MEANING**	**TRANSFER**
Note: These three goals are of course interrelated. However, there is merit in distinguishing them to sharpen and focus teaching and assessment.	This goal seeks to help learners *acquire* factual information and basic skills.	This goal seeks to help students *construct meaning* (i.e., *come to an understanding)* of important ideas and processes.	This goal seeks to support the learner's ability to *transfer* their learning autonomously and effectively in new situations.
Teacher Role/ Instructional Strategies *Note: Like the above learning goals, these three teaching roles (and their associated methods) work together in pursuit of identified learning results.*	<u>Direct Instruction</u> In this role, the teacher's primary role is to *inform* the learners through explicit instruction in targeted knowledge and skills; differentiating as needed. *Strategies include:* ❍ diagnostic assessment ❍ lecture ❍ advanced organizers ❍ graphic organizers ❍ questioning (convergent) ❍ demonstration/modeling ❍ process guides ❍ guided practice ❍ feedback, corrections, ❍ differentiation	<u>Facilitative Teaching</u> Teachers in this role engage the learners in actively processing information and guide their inquiry into complex problems, texts, projects, cases, or simulations; differentiating as needed. *Strategies include:* ❍ diagnostic assessment ❍ using analogies ❍ graphic organizers ❍ questioning (divergent) & probing ❍ concept attainment ❍ inquiry-oriented approaches ❍ Problem-Based Learning ❍ Socratic Seminar ❍ Reciprocal Teaching ❍ formative (on-going) assessments ❍ understanding notebook ❍ feedback/ corrections ❍ rethinking and reflection prompts ❍ differentiated instruction	<u>Coaching</u> In a coaching role, teachers establish clear performance goals, supervise on-going opportunities to perform (independent practice) in increasingly complex situations, provide models and give on-going feedback (as personalized as possible). They also provide "just in time teaching" (direct instruction) when needed. *Strategies include:* ❍ on-going assessment, ❍ providing specific feedback in the context of authentic application ❍ conferencing ❍ prompting self assessment and reflection

Learning Goals and Student Actions

Three Interrelated Learning Goals →	ACQUIRE	MAKE MEANING	TRANSFER
Note: Not every learner action will be applicable to every situation. Nonetheless, these are the kinds of learner actions needed to achieve the various learning results.	*In order to acquire knowledge and skills, learners need to:* ❍ listen, read, and view carefully ❍ respond ❍ take notes ❍ ask questions ❍ use mnemonics ❍ link to prior knowledge ❍ compare ❍ create non-linguistic representations ❍ rehearse/practice ❍ complete classwork and homework ❍ self assess ❍ set learning goals ❍ employ productive habits of mind	In order to *make meaning* (i.e., come to an understanding) of important ideas and processes learners need to: ❍ listen, read, and view critically ❍ respond thoughtfully ❍ take reflective notes ❍ critically question ❍ compare ❍ make inferences ❍ create analogies ❍ make connections ❍ create non-linguistic representations ❍ *rehearse/practice mindfully* ❍ self assess ❍ reflect on their understanding ❍ rethink ideas ❍ set learning goals ❍ employ productive habits of mind	In order to develop the capacity to *transfer* their learning, students need to: ❍ apply their learning in novel and increasingly complex situations. ❍ observe the results ❍ listen to and act on feedback ❍ engage in focused practice ❍ visualize performance ❍ re-try ❍ refine ❍ rethink action ❍ revise ❍ reflect on performance ❍ employ productive habits of mind

Tips for Using Essential Questions

1. Organize programs, courses, units of study, and lessons around the questions. Make the "content" answers to questions.

2. Select or design assessment tasks (up front) that are explicitly linked to the questions. The task(s) and performance standards should clarify what acceptable pursuit of, and answers to, the questions actually look like.

3. Use a reasonable number of questions per unit (2-5). Make less be more. Prioritize 'content' for students to make the work clearly focus on *a few key* questions.

4. Frame the questions in "kid language" as needed to make them more accessible. Edit the questions to make them as engaging and provocative as possible for the age-group.

5. Ensure that every child understands the questions and sees their value. Conduct a survey or informal check, as necessary, to ensure this.

6. Derive and design specific concrete exploratory activities and inquiries for each question.

7. Sequence the questions so they "naturally" lead from one to another.

8. Post the essential questions in classroom(s), and encourage students to organize notebooks around them to make clear their importance for study and note-taking.

9. Help students to personalize the questions. Have them share examples, personal stories, and hunches. Encourage them to bring in clippings and artifacts to help make the questions come alive.

10. Allot sufficient time for "unpacking" the questions — examining sub-questions and probing implications — mindful of student age, experience, and other instructional obligations. Use question/concept maps to show relatedness of questions.

11. Share your questions with other faculty to make planning and teaching for cross-subject matter coherence more likely. Ideas to promote overarching questions school-wide — ask teachers to post their questions in the faculty room and/or in department meeting/planning areas. Type and circulate questions in the faculty bulletin. Present and discuss at faculty and P.T.S.A. meetings.

Other tips: _____

_____

Teaching and Assessing for Understanding – Observable Classroom Indicators

To what extent are…

1. Instruction and assessment focused on "big ideas" and essential questions based on established standards/outcomes?	**4**	**3**	**2**	**1**
2. Essential questions posted and revisited throughout a unit?	**4**	**3**	**2**	**1**
3. Pre-assessments used to check students' prior knowledge and potential misconceptions regarding new topics of study?	**4**	**3**	**2**	**1**
4. Opening "hooks" used to engage students in exploring the big ideas and essential questions?	**4**	**3**	**2**	**1**
5. Students' understanding of the "big ideas" and core processes assessed through authentic tasks involving one or more of the six facets?	**4**	**3**	**2**	**1**
6. Evaluations of student products/performances based upon known criteria/rubrics, performance standards, and models (exemplars)?	**4**	**3**	**2**	**1**
7. Appropriate instructional strategies used to help learners' **acquire** knowledge and skills, **make meaning** of the big ideas, and **transfer** their learning?	**4**	**3**	**2**	**1**
8. Students given regular opportunities to rethink, revise and reflect on their work based on feedback from on-going (formative) assessments?	**4**	**3**	**2**	**1**
9. The students expected to self-asses/ reflect on their work/learning and set goals for improvement?	**4**	**3**	**2**	**1**
10. Other: _____	**4**	**3**	**2**	**1**

Characteristics of the Best Learning Designs...

(based on surveys of K-16 faculty throughout the nation)

Expectations ***the best learning designs...***

- provide clear learning goals and performance expectations.
- cast learning goals in terms of genuine/meaningful performance.
- frame the work around genuine questions & meaningful challenges.
- show models/exemplars of expected performance.

Instruction ***in the best learning designs...***

- the teacher serves as a facilitator/coach to support the learner.
- targeted instruction and relevant resources are provided to "equip" students for expected performance.
- the textbook serves as one resource among many (i.e., text is resource, not syllabus).
- the teacher "uncovers" important ideas/processes by exploring essential questions and genuine applications of knowledge and skills.

Learning Activities ***in the best learning designs...***

- individual differences (e.g., learning styles, skill levels, interests) are accommodated through a variety of activities/methods.
- there is variety in work, methods and students have some choice (e.g., opportunities for both group and individual work).
- learning is active/experiential to help students "construct meaning".
- cycles of *model-try-feedback-refine* anchor the learning

Assessment ***in the best learning designs...***

- there is no mystery as to performance goals or standards.
- diagnostic assessments check for prior knowledge, skill level, and misconceptions.
- students demonstrate their understanding through "real world" applications (i.e., genuine use of knowledge and skills, tangible product, target audience).
- assessment methods are matched to achievement targets.
- on-going, timely, and descriptive feedback is provided.
- learners have opportunities for trial and error, reflection and revision.
- self-assessment is expected.

Sequence & Coherence ***the best learning designs...***

- start with a "hook", immerse the learner in a genuine problem/issue/challenge.
- move back and forth from whole to part, with increasing complexity.
- scaffold learning in "do-able" increments.
- teach as needed; don't over-teach all of the "basics" first.
- revisit ideas – have learners rethink and revise earlier ideas/work.
- are flexible (e.g., respond to student needs; revise plan to achieve goals).

